historic structure report

ministrative, historical and architectural data sections

SEAWALL
FORT McHENRY

NATIONAL MONUMENT AND HISTORIC SHRINE / MARYLAND

HISTORIC STRUCTURE REPORT
Administrative, Historical and Architectural Data Sections
Seawall

FORT MCHENRY NATIONAL MONUMENT AND HISTORIC SHRINE
Maryland

Prepared by

Sharon A. Brown
and
Susan Long

August 1986

U.S. Department of the Interior / National Park Service

TABLE OF CONTENTS

Administrative Data

I. Administrative Data 3
- A. Location of Structure 3
- B. Significance of Structure 3
- C. Proposed Treatment of Structure and Justification for Treatment 4
- D. Cooperative Agreements 4

Historical Data

Preface 7

Introduction 9

II. Construction History of Fort McHenry Seawall 11
- A. The Seawall is Needed and Built 1794-1829 11
  - 1. Fort on Whetstone Point 11
  - 2. "the ground being undermined" 12
- B. Second Stage Estimates, Construction and Repair 1830-1869 19
  - 1. Requests to Extend Seawall 19
  - 2. The Wall is Built 20
  - 3. Damage and Repair 24
  - 4. Further Requests to Extend Seawall 25
- C. Interim Repair and Change 1876-1893 28
  - 1. Damage and Repair 28
  - 2. Dry Dock and Landfill 40
  - 3. Health Concerns 43
  - 4. Threat to Seawall from Miners 45
- D. Third Stage Construction 1894-1897 48
  - 1. Requests to Protect Cemetery and South Front 48
  - 2. Building Seawall Behind Cemetery 51
  - 3. Building Seawall on South Front 53
  - 4. Requests to Extend Seawall on Northwest Front 55
  - 5. Building Seawall on Northwest Front 56
- E. Twentieth Century Damage and Repair 60
  - 1. Changes under the War Department 60
  - 2. National Park Service Ownership 62

Chronology 67

Recommendations for Further Research 79

Illustrations 81

Appendices 139
Appendix A: Building a Sea=Wall, Contract, August 1896 140
Appendix B: Daily Journal of Operations on Fort McHenry, 1896 149

Annotated Bibliography 155

Persons Consulted During Research 159

Architectural Data

III. Existing Conditions 163
A. Historic Conditions 163
B. Existing Conditions 163
C. Present Conditions 163

Proposed Work Program 165
A. Alternative "A" - No treatment 165
B. Alternative "B" - Pump grout the wall 165
C. Alternative "C" - Place riprap in front of the wall 165
D. Alternative "D" - Preferred alternative 165
E. Multiphase Work Program 166
1. Phase 1 166
2. Phase 2 166
3. Phase 3 166
F. Impact Analysis 167
G. Estimates 169

Illustrations 173

Appendix A: Archeological Investigations and Comments 197

Individuals and Offices Consulted 207

ILLUSTRATIONS

Historical Data

1. Plan of Fort McHenry 1803
2. HABS map of Fort McHenry 1814
3. William Tell Poussin Plan and Profile of Fort McHenry 1819
4. Historical Base Map of Fort McHenry 1819 (1942)
5. Fort McHenry 1834
6. Fort McHenry 1836
7. Plan of Exterior Barbette Battery of Fort McHenry 1870
8. 1870 Exterior Barbette Battery, Detail
9. 1878 map of proposed boundary change
10. 1870 map showing encroachment of high waterline and location of proposed seawall
11. 1870 seawall proposal, Detail
12. Plan of Fort McHenry 1888
13. Sketch to show proposed change of wharf at Fort McHenry 1893
14. Fort McHenry, Maryland 1912
15. 1910 postcard showing seawall
16. 1920 postcard showing seawall
17. General Hospital No. 2, Fort McHenry, Maryland. Seawall 1919
18. Seawall 1919, Detail
19. Aerial view, General Hospital, No. 2, c. 1925
20. Repairs--seawall, sidewalk, etc., damaged by storm, August 23, 1933
21. 1933 seawall repair, Detail
22. Fort McHenry National Park stone walls, 1937
23. Photograph of 1938 pointing on seawall
24. Photograph of pre-1948 seawall damage
25. Photograph of pre-1948 seawall damage
26. Photograph of pre-1948 seawall damage
27. Photograph of August 1955 seawall damage from hurricane "Connie"
28. Photograph of August 1955 seawall damage from hurricane "Connie"
29. Detail of 1974 riprap protection for the seawall proposal

Architectural Data

Figures

1. Soil flushed out from behind wall and resulting void
2. Capstone displaced and toppled into harbor
3. Section of wall if protrusion is the historic configuration
4. Lower third of wall displaced due to force created by water and plastic soil behind wall
5. Rehabilitated wall section (typ.)

Photographs

1. Station 11 + 97.05 looking south capstones displaced due to loss of soil
2. Detail of void behind wall
3. Displaced capstone toppled into harbor
4. Station 13 + 17.05--Station 13 and 84.05. Unraveled section of wall
5. Station 18 + 00. Protruding lower third of wall
6. Station 16 + 39.04 looking south. Protruding lower third of wall
7. Station 18 + 00 looking south. Protruding lower third of wall

HISTORIC STRUCTURE REPORT
Administrative Data
Seawall

FORT MCHENRY NATIONAL MONUMENT AND HISTORIC SHRINE
Maryland

Prepared by

Susan Long

I. ADMINISTRATIVE DATA

A. Location of Structure

Fort McHenry National Monument and Historic Shrine is located in the Northwest (Inner) Harbor on Locust Point (historically known as Whetstone Point) approximately 2-1/2 miles from downtown Baltimore. The park is surrounded on three sides by Northwest (Inner) Harbor and middle branch of the Patapsco River. The seawall is located on the perimeter of the park protecting the park land from erosion by these rivers.

B. Significance of Structure

Fort McHenry first became a public park belonging to the City of Baltimore in 1914. In 1925 Congress enacted a law (43 Stat. 1109) providing for the restoration of Fort McHenry and its preservation as a national park and a national memorial shrine.

In 1933 Fort McHenry National Park was transferred from the War Department to the Department of the Interior. In 1939 its designation was changed from Fort McHenry National Park to Fort McHenry National Monument and Historic Shrine. The seawall at Fort McHenry was built in sections beginning in 1816 and finished in 1895. It was placed on the National Register of Historic Places in 1966 and is included in the List of Classified Structures. It has been assigned to Management Category B, "structures that should be preserved and maintained."[1]

In addition the seawall should be preserved because it is needed to secure the site. The location of the park on Locust Point in the Northeast (Inner) Harbor makes it susceptible to severe wave wash from northerly and southerly storms and large swells caused by vessels entering and leaving the habor. Thus in addition to its historic value the seawall must be maintained to protect the park from erosion caused by wave action.

---

1. National Park Service, Cultural Resource Management Guideline, NPS-28, Appendix H, p. 4.

C. Proposed Treatment of Structure and Justification for Treatment

In accordance with Management Policies of the National Park Service

> A historic structure shall be preserved in its existing form on the basis of the following criteria:
>
> 1. The structure, upon acquisition, already possesses the integrity and authenticity required. . .

The seawall should be preserved both to retain its historic integrity and so that it may continue its historic and necessary function of securing the site.

D. Cooperative Agreements

There are no cooperative agreements pertaining to the seawall, however, there are three easements that pertain to the seawall. They are as follows:

1. In 1913 the War Department issued a permit to the U. S. Coast Guard for use and access a 20 square foot portion of land on which to construct a light and fog tower for Fort McHenry channel.

2. The War Department granted an easement in 1925 to the Mayor and City Council of Baltimore for a right-of-way through the park to install, operate, and maintain electric lines. These lines are submarine cables and cross under the seawall.

3. In 1947 an easement was granted to the Mayor and City Council of Baltimore by the Department of the Interior to install, maintain, and service two subterranean water mains, both of which cross under the seawall.

HISTORIC STRUCTURE REPORT
Historical Data
Seawall

FORT MCHENRY NATIONAL MONUMENT AND HISTORIC SHRINE
Maryland

Prepared by

Sharon A. Brown

"Of course now I feel like a nurse who, though at times fatigued with her cares dislikes to give up her patient before he is cured--And then, you know, one gets fond of what one has been caring for a long time--that is the way I feel about Ft. McHenry."

Major Loomis L. Langdon to "My Dear Colonel"
William Craighill
May 3, 1885

PREFACE

Fort McHenry was built 1794-1802 on Whetstone Point as a defense for the city of Baltimore, Maryland. Named for Secretary of War James McHenry, the fort's historic significance stems from its 25-hour bombardment by the British on September 13-14, 1814, during the War of 1812. Suffering only minor casualties, the American forces under Major George Armistead held the fort; Baltimore was saved and the British withdrew.

Lawyer Francis Scott Key, onboard an American vessel in Chesapeake Bay arranging for a prisoner's release, observed the bombardment. Upon seeing the American flag still waving over the fort after the attack, Key was moved to write a poem, "The Star Spangled Banner." Key's words, later set to a British tune, became the United States' National Anthem in 1931.

No more fighting occurred at the fort after 1814 but it remained a coastal defense installation. The fort's later uses included serving as a Union prison during the Civil War, as an immigration station, and as a World War I Army hospital. The War Department administered the fort as a park after 1925, before turning the site over to the National Park Service in 1933.

Fort McHenry's seawall, built in stages after 1816, has protected Whetstone Point (Locust Point) from the ravages of weather and tide for 169 years. Located on the park's perimeter the seawall has performed its task well, but through the years it suffered damage from storms and hurricanes. Both the Army and the National Park Service have continually repaired the seawall, realizing the protection it provides the fort. Without this protection, Whetstone Point would be significantly altered or indeed, washed away.

INTRODUCTION

Fort McHenry National Monument and Historic Shrine was transferred to the National Park System on August 10, 1933. The site is located in Baltimore, Maryland, three miles from the center of town on East Fort Avenue. The Northwest (Inner) Harbor and middle branch of the Patapsco River surround the fort on three sides. Fort McHenry is a National Landmark and is listed in the National Register of Historic Places.

This historic structure report has been prepared to satisfy the research needs as stated in the task directive approved by Mid-Atlantic Regional Director James W. Coleman Jr., on May 27, 1983. Data from this report will be used to plan the preservation of the seawall at the park. Emphasis in research and writing was placed solely on specific construction data relating to the seawall. The report is not a detailed history of Fort McHenry as other National Park Service publications and secondary source writings have addressed that topic.

Most of the author's research was conducted in the Historical and Archeological Research Project (HARP) files, compiled from original sources in 1957-1958. Arranged chronologically and by subject matter, the 264 binders contain a wealth of information concerning Fort McHenry from pre-1776 to 1958. Additional data to 1984 has been compiled in binders by the park staff. The HARP collection consists not only of photocopied materials in the binders, but maps and microfilm as well. Limitations to efficient use of the HARP files occur because no useable index exists, cross-references are not complete, and not all of the material on the microfilm was copied for the binders. Additionally, citations referring to the original sources, located in National Archives record groups or elsewhere, are not always decipherable. Information gaps also exist for spans of years. However, less documentation does not necessarily mean no work was done on the seawall.

Time and money constraints limited research to the HARP files. These HARP files provided sufficient data for a construction history of the seawall. Research for the historical data section was conducted during two field trips to Baltimore in January and February 1985.

The author would like to thank ex-Superintendent Juin Crosse-Barnes and the exceptionally helpful staff at Fort McHenry. Park Technician Scott Sheads provided an orientation to the HARP files and research assistance. Chief of Visitor Services Terry DiMatteo and Park Ranger Bill Justice provided additional research assistance. John McGarry lent his Fort McHenry postcard collection and William Stokinger offered valuable ideas concerning the seawall's construction. Supervisory Historian Ronald W. Johnson provided counsel throughout the project. Beverly Ritchey and Nancy Arwood typed the manuscript.

Sharon A. Brown

II. CONSTRUCTION HISTORY OF FORT MCHENRY SEAWALL

A. A Seawall is Needed and Built 1794-1829

1. Fort on Whetstone Point

The United States Congress passed legislation authorizing the construction of a fort on Whetstone Point in 1794 after the French Revolution. Fortifications consisting of an upper and lower battery with 18 cannon existed as early as 1776 on the point, as well as a fort by 1777, but these were supplanted by new works designed by French artillery officer Major John Jacob Ulrich Rivardi. This officer rebuilt the batteries and built a masonry fort, but the work proceeded very slowly throughout 1794 to 1798. The rate of construction increased in 1798 and in the next year another French engineer, Jean Foncin, developed new plans for the Baltimore fortifications. The extant fort, completed by 1802, is the result of Foncin's ideas and was built over remnants of the old star fort.[1] (See illustration 1 for plan of Fort McHenry in 1803.)

Further construction of defenses occurred after the War of 1812 was declared. These defenses included among other things brick traverses or walls which were built in front of the fort's gateway and the magazine. Fort McHenry's moment of glory in history came on September 13 and 14, 1814, when its garrison withstood a British bombardment lasting 25 hours.[2] However, no seawall survived this bombardment and shared in the fort's victory because no seawall had yet been built. (See illustration 2 for HABS map showing Fort McHenry in 1814.)

---

1. U.S. Department of the Interior, National Park Service, "Historic Structure Report, Fort McHenry, Historical and Architectural Data, Fort McHenry National Monument and Historic Shrine Maryland," by Erwin N. Thompson and Robert D. Newcomb, Denver, October 1974, pp. 9-16; Harold Kanarek, The Mid-Atlantic Engineers: A History of the Baltimore District, U.S. Army Corps of Engineers, 1774-1974, (Washington, D.C.: Government Printing Office, (1979?), pp. 2-3.

2. Thompson, HSR, pp. 20-21, 26.

2. "the ground being undermined"

As early as 1794 John Jacob Ulrich Rivardi commented on the damage being done to Whetstone Point by the waters of Patapsco River. In a letter to Maryland Governor Thomas Sin Lee on April 13 Rivardi wrote that the fort's "Salient angle B is intirely [sic] destroy'd, the ground being undermined altogether by the water for the space of eleven Perches and one half so that there is no possibility of making the old work serve without the addition of a very expensive dam."[3] Rivardi's solution to the problem was to move back the salient angle on the point so there was enough ground for gun platforms and "sufficient slope from the outside of the battery to the water, including a Berme to prevent the ground from falling down."[4]

The War Department did not undertake the construction of a wall until years later. The next known mention of the need for a wall appears in May 1814. Major George Armistead, the fort's commander during the subsequent bombardment in September, measured the distance for a stone wall to be built in front of the lower or water battery. After considering the quantity of stone needed, prices, labor and workmen required, Armistead arrived at a cost estimate of $15,800. He also thought funds could be saved by employing "Soldiers, and men under sentence of Genl Court Martial." Armistead was prompted to make the construction request because "the last N.E. storm has injured it [the battery] materially."[5]

---

3. "Plan of Fort McHenry," Maryland Historical Magazine 8 (1913): 287. A perch is any defined unit of measurement. A salient angle is the projecting angle formed by two faces of a bastion.

4. Ibid.

5. Historical and Archeological Research Project (HARP), National Archives (NA), Record Group-107 (RG), SW, LR, Major George Armistead to General John Armstrong, May 14, 1814.

The Army took no action on Armistead's request. Two years later the problem and what to do about it was still being pondered. On September 6, 1816, Chief Engineer Brigadier General Joseph G. Swift asked Army Engineer Colonel Walker K. Armistead (George Armistead's brother) to "examine the matter immediately" and to report what "kind of quantum of Wall that would secure the point," as well as how much stone was needed for a wall to enclose the site.[6]

Lieutenant Thomas W. Maurice examined the "breech made by the tides and weather on the point" and reported to Colonel Walker Armistead that "a part of old fort Wetstone" had been washed away. In Maurice's opinion the site required a stone wall four feet thick with a one and a half foot foundation and six feet in height. The quantity of building materials needed was:

Agreeable to instructions received
1900 Perches stone $3 pr P
1100 bushels lime 50 cts B
2,700 do Sand 1.50 per ton

In my opinion should be
2,500 Perches stone $3 pr P
1,000 bushels lime 50 cts
2,700 do Sand 1.50[7]

General Swift responded to Lieutenant Maurice's estimate by writing both Armistead brothers on November 15. Swift complained to Walker Armistead that Maurice did not include "the price of Labour & Materials" even "in a place where so much Stone & Brick Work is done as in Baltimore." He suggested to Armistead that the labor be "done by

---

6. HARP, NA, RG-77, Buell's Collection, Engineer Historical Papers, 1800-1819, J.G. Swift to Col. W.K. Armistead, September 6, 1816.

7. HARP, NA, RG-77, Office of the Chief of Engineers (OCE), Reports, July 1812 - October 1823, I, Thos. W. Maurice to Col. W.K. Armistead, November 6, 1816.

Fatigues from your Brothers Command."[8] Swift requested $4,000 be remitted to George Armistead for the construction of both the seawall and boundary wall, and told the fort's commander, "Your Brother will direct the work you have undertaken." Evidently the work had already been started because Swift complained, "It would have been better that I should have been advised of the nature & extent of the Work before it was commenced."[9]

Swift wrote Acting Secretary of War George Graham on the same day, apprising him of the cost of both walls, "probably" costing $11,000. George Armistead was to attend to the work under the direction of his engineer brother. Funds totaling $4,000 were to be remitted to Armistead "immediately."[10] In early December Swift wrote Graham again, telling him the "work has been commenced. . . ."[11]

General Swift inspected the work in April 1817. He saw the evident effect of the water upon the point and concluded "nothing but a Sea wall can preserve it from being swept away." He then directed that George Armistead "complete the wall in a substantial manner, its length will be about 600 yards. . . ." The estimated cost was $1,300 and Armistead was to receive an initial remittance of $9,100 for completing the seawall and brick enclosing wall, repairing the gun platforms, and

---

8. HARP, NA, RG-77, Buell's Collection, Engineer Historical Papers, 1800-1819, "Your Obt. hum. St." to Col. W.K. Armistead, November 15, 1816. The soldiers would receive an extra 15 cents per day or an "extra gill" for working on the fortifications. A gill measured 1/4 pint of liquid, presumably liquor.

9. HARP, NA, RG-77, Buell's Collection, Engineer Historical Papers, 1800-1819, "Your Obt. hum. Svt." to Lt. Col. Geo. Armistead, November 15, 1816.

10. HARP, NA, RG-77, Buell's Collection, Engineer Historical Papers, 1800-1819, "Your most obedient & very humble Servant" to Geo. Graham Esquire, November 15, 1816.

11. HARP, NA, RG-77, Buell's Collection, Engineer Historical Papers, 1800-1819, Joseph G. Swift B.G. to to George Graham, December 4, 1816.

sodding. The troops were still employed to perform as much of the work as practicable.[12]

In December 1817 George Armistead reported to General Swift the brick boundary wall's completion and that the wall's gate needed only "a finish on the top of the Arch. . . . " Armistead also commented on the seawall:

> One thousand four hundred sixty feet of the Sea wall, with foundation of three feet below the surface and raising generally about four feet above the surface and varying from four feet to six in thickness, with counterforts four [?] hundred & Seventy feet more will complete it and form a lasting barrier to the point.[13]

As vague as George Armistead's statement is, no other reference to the seawall's possible completion at this time was found. Citations in the next year refer to the need for further protection of the point and completion of work started by George Armistead--work which most likely included further efforts on the seawall. In January 1818 General Swift informed Secretary of War John C. Calhoun of his orders to Armistead to "finish the wall" commenced under Swift's directions "to secure the site of Fort McHenry from the Effect of the tide. . . ."[14] By June 1818 Major Jacob Hindman, who followed George Armistead as Fort McHenry's commanding officer, received instructions to "complete the works" begun by Armistead.[15]

---

12. HARP, NA, RG-77, OCE, Reports, July 1812-October 1823, I, J.G. Swift to George Graham, April 10, 1817; Ibid., J.G. Swift to Col. G. Armistead, April 10, 1817.

13. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, G. Armistead to Genl J.G. Swift, December 31, 1817.

14. HARP, NA, RG-77, Buell's Collection, Engineer Historical Papers, 1800-1819, Inclo. 759, J.G. Swift B. Genl. to John C. Calhoun Esquire, January 9, 1818.

15. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, C. Vandeventer to Col. Jacob Hindman, June 25, 1818.

The only description of any further work was found in a letter Hindman wrote to Walker Armistead. A severe storm on the "4th or 5th" of December had not damaged the seawall. Hindman attributed this to the seawall's strength which "consists of the Solid back we very Fortunately gave it after it was raised to its Intended height. We have filled in with Earth &c So that I think no rain will effect it." Coping was still needed, a project the commanding officer wanted to commence the following spring. The dimensions of stone Hindman needed for "this purpose its permanent Security" was not less than "Eight Inches thick 2 feet in width, I doubt that in lenght [sic]." Hindman would have to obtain the stone by contract and he hoped to pay less than $.37 per foot. Hired laborers are mentioned here for the first time as Hindman discharged them and planned to continue the work occasionally through the winter with soldiers. He also requested $2,000 for the coping work.[16]

Armistead was "pleased" with Hindman's report of the seawall and he hoped "it may continue to resist the effects of the Storms and Waves." As for the coping, however, Armistead wondered if it would be better to use granite instead of free stone for its durability, lower price, and easy procurement from "the Susquehannah." Hindman received the desired $2,000.[17]

No further mention of the wall appears until September 1819 when Jacob Hindman proposed a further extension of the seawall. However, Lieutenant J. L. Smith recommended that the wall, to be extended "from the point where the wall now building was commenced to the wharf," not be undertaken at the present time. Writing to Colonel Walker Armistead, Smith stated that an extension of the seawall could be dispensed with without hazard to the site. Smith thought the "situation"

---

16. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, Jb Hindman to "Sir" [Walker Armistead], December 15, 1818.

17. HARP, NA, RWD, RG-77, OCE, SPLOE, 1812-69, W.K. Armistead Lieut. Col. Com. Engineers to Col. J. Hindman, December 21, 1818.

was sheltered by the point and that a "bank forming 30 or 60 feet from the shore" afforded a good protection. The secretary of war, who had no objection to Hindman's request to complete the "wall now under operation," nevertheless wanted to limit expenditures at the fort. Hindman would be notified if a change in this status occurred.[18]

In November 1819 Colonel Walker Armistead reported to Acting Secretary of War Major C. Vandeventer that all repairs at Fort McHenry commenced under George Armistead's direction and continued under Jacob Hindman had been discontinued.[19] An 1819 plan and profile map of Fort McHenry, drawn by William Tell Poussin, clearly delineates the seawall. It extended from Fort McHenry's southern property boundary to the upper battery. Evidence can be seen of counterfort construction, or buttresses on the back side of the seawall. (See illustration 3 for Poussin 1819 plan. Illustration 4 is a 1942 historical base map of Fort McHenry in 1819.)

Only one reference in the next decade was found to the seawall, this being a proposal by Fort McHenry's commanding officer, Major M.M. Payne, to add second stories to the quarters with "bricks" obtained from "the old seawall in front of this work, or from old Fort Covington, without cost to the Government. . . ."[20] The exact meaning of this phrase is not clear. All of the documentary evidence suggests a dry laid wall construction of stone. Topped with a capstone, the seawall stood as a complete unit and could resist the river's erosion. Perhaps the first seawall construction was of brick and was, at some later period, relaid as a stone wall.

---

18. HARP, microfilm reel 24, J.L. Smith, Lt Corps of Engrs, September 15, 1819; HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, J.L. Smith to Col. Armistead, Chief Engr, September 21, 1819.

19. HARP, NA, RG-77, OCE, Reports, July 1812-October 1823, I, Col. W.K. Armistead to Major C. Vandeventer acting Secy. of War, November 30, 1819.

20. HARP, NA, RG-92, Office of the Quartermaster General (OQMG), Consolidated File, M.M. Payne, Major US Arty to Major Genl T.S. Jesup, Qr Mst Genl, June 1, 1829.

Only archeological investigation behind the seawall could answer this construction question. Investigation could also possibly identify the type and quantity of fill placed in back of the seawall which could be related to hydrological drainage problems the fort's structures are currently experiencing. Remnants of an older brick seawall located behind the present stone seawall could possibly be contributing to the drainage problems.

The scattered references to the seawall in the 1810s and 1820s imply that construction of the seawall began at least by November 1816 and was completed sometime in 1818. No sooner was this wall on the northeasterly face of the site's waterfront completed when the need was seen to extend the wall farther to the northwest. A shortage of funds precluded this immediate action, and subsequent construction did not occur until the late 1830s. George Armistead, Walker Armistead, and Jacob Hindman were responsible for the seawall's first stage of construction--a section which bore the brunt of the northeasterly storms.

B. Second Stage Estimates, Construction and Repair 1830-1869

1. Requests to Extend Seawall

Fort McHenry experienced extensive repair and construction in the mid- to late 1830s. Not only were new fortifications built, but requests to extend the seawall increased as did the realization that the size of the Federal Government's holdings on Whetstone Point needed to be enlarged.

Fort McHenry's commanding officer, Major Payne, submitted an estimate in 1830 for funds required to complete the seawall, but his request was denied because of insufficient funds.[1] Eleven years had passed since Jacob Hindman asked for the seawall's extension yet the reason for refusal remained the same. Further seawall construction occurred only when combined with general fort improvements and the purchase of more acreage on the point.

The boundary of the government's ground did not extend much farther than the limits of the fort. According to several engineers in 1831, if an enemy siege was laid the "feebleness" of the fort and the low nature of the ground would restrict any resistance of an attack. Adjacent tall buildings on private land having a command of the grounds would be kept a farther distance away if more land were purchased, thereby reducing the capacity to "reduce" the fort with "the fire of musketry." A recommended new boundary was a straight line across the neck of the point, "distant from the N.W. Salient of the Fort, 300 yards." Private land within the proposal totaled 25 acres which could be purchased for $10,000.[2]

Years passed before Fort McHenry enlarged its boundaries. Captain Henry A. Thompson, the fort's project engineer informed Chief

---

1. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, M.M. Payne to Genl Gratiot, Engineer Dept., May [?] 8, 1830; HARP, NA, RG-77, OCE, LS, 182-1872, C. Gratiot to Major M.M. Payne.

2. HARP, NA, RG-77, OCE, LR, T-1575, J.L. Totten, Engs Brevet Col and A. Mordecai, Lt Engrs to Gratiot, July 13, 1831.

Engineer Charles Gratiot on September 6, 1836, of his purchase of 12 acres at $1,000 per acre. Thompson had yet to buy two other lots farther west. The boundary was moved about 320 yards from the fort walls.[3] Two months later the purchases amounted to 17 1/2 acres, with "8 or 10 more" being required. Land purchases in 1836 and 1837 finally totaled about 28 acres. The extension of the seawall was necessary to enclose this extra property now belonging to the government.[4]

This enlargement of property occurred in conjunction with a major construction program at the fort. By August 1836 the troops temporarily left the site so construction could proceed without interference. The fort was turned over to the Engineer Department.[5] (See illustration 6 for 1836 map of proposed work, including land measurements.)

2. The Wall Is Built

Further construction of the seawall proceeded under this flurry of activity. Thompson informed Gratiot on November 10 that the portion of the seawall needing completion "on the North East part of the Point, on which the Fort stands" would be finished by the "latter end of January next." Thompson contracted for the necessary stone which was to be delivered by December 15. Thompson also recommended that the seawall "be continued to the extremity of the new purchase." He estimated the cost at $10,000.[6] Five days later Thompson sent Gratiot an

---

3. HARP, NA, RG-77, OCE, LR, T-2716, H.A. Thompson to Br. Gen. Gratiot, September 6, 1836.

4. HARP, NA, RG-77, OCE, LR, T-2766. H.A. Thompson to Gen. Gratiot, November 10, 1836. HARP, NA, RG-77, OCE, LR, S-1028, Hy. A. Thompson to "My dear Captain," March 2, 1840.

5. HARP, NA, RG-77, OCE Orderly Books, R. Jones Adj. Genl, S. Order Sr [?] 70, August 29, 1836. See Thompson, HSR, pp. 39-52 for a history of construction at the fort from 1833-1839.

6. HARP, NA, RG-77, OCE, LR, T-2766, H.A. Thompson to Gen. Gratiot, November 10, 1836.

estimate for repairs at Fort McHenry which included "the estimated expense of building a Sea Wall to the new purchase" for $10,000.[7]

An 1834 map of Fort McHenry reveals that the seawall had been extended at sometime from the site of the upper battery to the property boundary line by the wharf. (See illustration 5 for 1834 Fort McHenry map.) No documentary evidence of this construction was found. Perhaps the same information Thompson supplied Gratiot can be interpreted to mean that the work needing completion on the seawall at the "North East" part of the point consisted of continued work to extend the seawall from the battery to the boundary. Perhaps the work required two years to complete. Thompson then got the money to extend the seawall (as well as build a new brick boundary wall) to the new purchase boundary and the work began in 1836.

Captain Thompson offered the following description of the work's progress to Chief Engineer Gratiot in October 1837:

> The Sea wall of Granite from the Susquehannah, has been built to the extent of 1300 ft exclusive of the Coping about 600 ft remains to be finished on the North Side, & about 1000 ft on the South side of the Peninsula in which the Fort Stands. These walls I conceive very necessary, & when joined by the Brick Wall now under construction across the Peninsula, all the public lands will be completely & firmly enclosed.[8]

Thompson also submitted the following estimate for the work:

For 2000 perches of Stone to finish the Sea Wall to the Land recently purchased	5000.00
For the Coping to the Same	2880.00[9]

---

7. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, H.A. Thompson to Genl. Gratiot, November 15, 1836.

8. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, H.A. Thompson to Genl. Gratiot, October 24, 1837.

9. HARP, microfilm reel 16, H.A. Thompson to Gen. Gratiot, October 24, 1837.

Near the end of the year Thompson informed Gratiot of the work remaining to be done on the seawall: "The Stone Wall about 1700 feet remaining to be built, & the Coping Stone laid on about 1200 feet." Thompson expected to finish the work at the fort by September 30, 1838, and that "this place" would be ready for occupation at that time. This goal was not reached.[10]

The seawall work did not go as planned because "operations" did not commence until August 1 on the seawall, and only "small progress" had been made by October 29, 1838. Thompson informed Chief Engineer Gratiot that when the wall was finished its length would be 2111 feet, and he described the work accomplished during the past year:

> on this [wall] there were laid this season 830 feet of Coping Stone & 150 feet of the wall built--950 feet have been completed, 1550 feet of wall, four feet & an [sic] half high, have been built, exclusive of the foundation, which varies from eighteen inches to two feet deep; thus leaving but 561 feet to be built, of which the foundation has been laid this summer except about 50 feet.[11]

Several days later Captain Thompson submitted a report on the year's work. He exclaimed, "My sea wall is completed except 600 feet the foundations of which is laid--& then shall have about 1000 ft if coping to put on which has been delivered."[12] The end of the year "Report of the Secretary of War" for 1838 stated that the seawall at Fort McHenry had been "completed to a length of 950 feet, and 1,550 feet more are 4 1/2 feet high."[13]

---

10. HARP, NA, RG-107, OCE, SC, FT-MC, 1811-37, H.A. Thompson to Gen. Gratiot, December 16, 1837.

11. HARP, NA, RG-77, OCE, LR, T-140, H.A. Thompson to Genl. Gratiot, October 29, 1838.

12. HARP, NA, RG-77, OCE, LR, T-140, H.A. Thompson to Capt. Smith, October 31, 1838.

13. HARP, House Doc. No. 2, 25th Congress, 3d Session, December 4, 1838, "Report of the Secretary of War," p. 155.

Captain Thompson's report on operations at Fort McHenry for 1840 contained only a brief statement on the seawall work: "The remaining part of the Sea Wall about 560 feet has also been finished."[14]

In March 1840 Captain Thompson reported that the seawall, which had been started October 1, 1836, was worked on intermittently until August 1839. "This wall commences at the N.E. point of the Property & runs to the Boundary Wall." The granite for the seawall cost $9,074.82. Very little lime was used, "not exceeding $50 worth or about 120 bushels," and to the best of Thompson's recollection, not more than 30 bushels of cement was used "To the Sea Wall--the rest was used to the revetments & Concrete mixture for foundations Say for Sea Wall $75." Of the $8,009.67 spent on the stone mason's work at the fort, all but $500 went for "cutting & laying the Stone for the Sea Wall."[15]

The second phase of the seawall's completion was finished by 1839. Unfortunately the references to the seawall in these army records do not clearly identify which section of the seawall was being repaired or built. Captain Thompson's confusing references further hinder attempts to pinpoint construction sites. Thus the records do not reveal exactly where the seawall began or ended during any given year. But it is possible to conclude that the seawall was extended from the battery to the old boundary c. 1834 and that the new section of seawall, built 1836-1839, extended from the northeast point of the old boundary line to the new brick boundary wall on the northwest corner of the government property. A seawall on the south side of the property would not be built for nearly 60 years.

---

14. HARP, NA, RG-77, OCE, LR, T-294, H.A. Thompson to Col. Totten, Chief Engineer, October 17, 1839. The chief engineer's postion was now filled by Joseph G. Totten.

15. HARP, NA, RG-77, OCE, LR, S-1028, HY. A. Thompson to "My dear Captain" [Smith], March 2, 1840; HARP, NA, RG-77, OCE, LR, S-1028 "Memorandum of expenses at Fort McHenry" [Henry Thompson], [April 1840].

3. Damage and Repair

No sooner was the seawall completed when it suffered damage in a storm--one of many through the years. A "gale from the North and East which continued with violence" over the evening of August 24, 1842, did "considerable injury to the seawall around the Fort." Commanding Officer Captain J.M. Washington also reported the public wharf had been washed away, but that the garrison recovered several timbers. He urged repairs be commenced with "the least possible delay."[16]

Repairs to the wharf and seawall were estimated to cost $250. An engineer from Washington was sent to examine the extent of damage. Lieutenant J.H. Trapier provided the following instructions for the repair work: "The prostrate portions of the wall are of course to be carefully relaid, and any single stones that have been recovered to be returned to their proper positions all which you are fully competent to do in the best manner."[17]

Lieutenant Trapier submitted the following estimate for repairs of the seawall:

Masonry	$ 40.00
Labour	80.00
Hire of Horses & Carts	12.50
Cement	7.00
Transportation of engr. officer to & from the Fort	20.00
Contingencies	5.50
Amount required	$165.00[18]

16. HARP, NA, RG-92, OQMG, Consolidated File, J.M. Washington to Brig. Genl. R. Jones, August 25, 1842.

17. HARP, NA, RG-92, OQMG, Consolidated File, Capt. S.B. Dusenberry to Genl Thos S. Jesup, August 29, 1842; HARP, NA, RWD, RG-77, OCE, SPLOE, 1812-69, Jos. G. Totten to Lt. J.H. Trapier, September 5, 1842.

18. HARP, NA, RWD, RG-77, OCE, LR, 1838-66, Trapier to Col. J.G. Totten, September 11, 1842.

The repairs to the seawall were finished by September 28.[19]

4. Further Requests to Extend Seawall

The seawall protected the north and east sides of the military site but the south side, even though less vulnerable to storms and waves, still suffered erosion. Requests to extend the wall on the south side began as early as 1837 and continued after the north section was completed. In January 1845 Lieutenant Pierre G.T. Beauregard of the Corps of Engineers in Washington received directions "in relation to a Sea Wall for the protection of the Hospital position, and also in relation to some works contemplated for the protection of the shore. . . ."[20]

Twelve years later Lieutenant Colonel Lorenzon Thomas inspected Fort McHenry and made the following observation:

> The Sea Wall has never been completed so as to secure the entire water fronts of the public grounds. It extends along the entire north side, round the east corner, and on the South side to a short distance west of the fort, but from this point to the west wall separating the public grounds from private property there is nothing to prevent the cutting away of the bank by the action of the waves--the heavy rains have made large gullies in this part of the public grounds which are increasing in extent! The wall should be completed. . . .[21]

Plans and cost estimates were made in February 1858 to grade the drill ground and complete the wall. Fort McHenry's commanding officer, Major William H. French, informed the secretary of

---

19. HARP, NA, RWD, RG-77, OCE, LR, 1838-66, Trapier to Totten, October 11, 1842.

20. HARP, NA, RWD, RG-77, OCE, SPLOE, 1812-69, ? to Lt P.G.T. Beauregard, January 7, 1845. Half of this letter is virtually undecipherable and the other half is missing from HARP.

21. HARP, NA, RWD, RG-77, OCE, LR, 1838-66, "Extract from the report of an inspection Made of Fort McHenry Md. November 28th, 1857 by Lieut. Colonel L. Thomas, Asst. Adjt. General."

war of the need for the work and estimated that grading the ground would cost from $600 to $1,000 while "The Sea Wall will be more expensive."[22]

French's request moved through the engineering hierarchy as Major Henry Brewerton of the Corps of Engineers submitted two alternative estimates on March 15, 1858: one for partial grading of the ground without finishing the seawall and without any attempt at stopping erosion in the bluff on the south side, and a second for grading, finishing the seawall and turning the bluff into a grassy slope. The second estimate read:

Seawall, 1026 cub. yds of dry rubble masonry at $6	$ 6,156
Apron for some 380 cub yds of stone at $1.50	570
Excavation, including arrangement in new position 15000 cub yds a 20c	3,000
Grassing 50000, square feet of slope	100
Contingencies	674
	$10,500.[23]

Captain of Engineers Horatio G. Wright submitted Brewerton's estimate to Secretary of War John B. Floyd on March 17, 1858. Wright commented, "There are, however, no funds applicable to this object and therefore nothing can be done until the necessary appropriation shall have been made by Congress." If Floyd thought it important to begin the work, Wright recommended that he apply to Congress for an appropriation of $10,500 as per Major Brewerton's estimate.[24]

---

22. HARP, NA, RWD, RG-77, OCE, LR, 1838-66, Wm. H. French to Colonel S. Cooper, February 9, 1858.

23. HARP, NA, RWD, RG-77, OCE, LR, 1838-66, Henry Brewerton, "Estimate of cost of grading drill ground and building Sea wall at Fort McHenry Baltimore Md." March 15, 1858.

24. HARP, NA, RWD, RG-77, OCE, LR, 1838-66, H.G. Wright to Hon. John B. Floyd, March 17, 1858.

Either Secretary Floyd did not think the work important or Congress did not see fit to appropriate the money, for in November 1862 in the midst of the Civil War Major Brewerton did not know if an appropriation had been made. Writing to Chief Engineer Joseph G. Totten, Brewerton referred to a letter written by Fort McHenry's commanding officer, Major William W. Morris, to Lieutenant Colonel W.D. Whipple of the Corps of Engineers. Morris' letter stated that an appropriation had been made and he requested that an engineer be directed to complete the seawall. Brewerton asked Totten if an appropriation had been made, if the engineer department were responsible for the seawall's construction and if so, he wanted instructions.[25]

No answer to Brewerton's query was found in the HARP files, but it is an obvious conclusion from the literature that the wall was not built. Reports of repairs conducted at the fort in 1866, 1868, and 1869 do not mention any seawall construction while later documents support construction dates in the 1890s.[26]

In the next two decades after the Civil War the seawall at Fort McHenry received attention in several different ways. Even though no new sections of seawall were built, continual storm damage required attention. Health and sanitation concerns arose, as did a threat to the seawall from mining operations in the Patapsco River. Change occurred at the northwest face of the seawall when land fill placed in front of it extended the reservation's acreage even further. The post-Civil War decades were fairly quiet ones at the fort (with the last major construction occurring 1866-1867) and the seawall's history followed suit. Repairs held sway, but major construction efforts were still years away.

---

25. HARP, NA, RG-77, OCE, LR, B-9359, Hen. Brewerton to Brig. Genl. Jos. G. Totten, November 5, 1862.

26. See: HARP, microfilm reel 49, Wm. P. Craighill to Bvt. Major Genl. A.A. Humphreys, December 10 1866; Ibid., J.H. Simpson to Humphreys, October 15, 1868; Ibid., Simpson to Humphreys, October 7, 1869.

C. Interim Repair and Change 1876-1893

1. Damage and Repair

The first mention of seawall damage found in the HARP files after 1842 involved Fort McHenry's commanding officer's report of damage on September 18, 1876. Lieutenant Colonel William H. French reported that a storm the previous day had not only carried away two-thirds of the wharf but had damaged the seawall. "The Sea Wall has been washed badly in placed beyond the Post Traders."[1]

Major William P. Craighill of the Baltimore U.S. Engineer Office further described the damage: "The storm also shook up badly, the south face of the sea wall about the site." Craighill believed repairs could be made within the next month.[2] The cost of repairs to the wharf and seawall was estimated to be less than $1,000, a sum which was promptly allotted. Repairs as extensive as funds would allow were made in October and continued through November.[3]

Conflicting evidence on damage to the seawall was found for the year 1878. One report in March stated the seawall "in enough places needs repairs, more or less extensive, but these are not inoperative, and, would require, a considerable outlay if undertaken."

---

1. HARP, microfilm reel 56, Wm. H. French to Major W.P. Craighill, September 18, 1876.

2. HARP, microfilm reel 46, Wm. P. Craighill, "Report of Operations at Defenses of Baltimore Harbor, Md. during the month of September 1876," October 1, 1876.

3. HARP, microfilm reel 46, Craighill to Brigadier General A.A. Humphreys, October 2, 1876; HARP, microfilm reel 46, "By Command & C" to Craighill, October 4, 1876; HARP, microfilm reel 56, Thomas Lincoln Casey, Lieut. Col. of Engineers to Craighill, October 4, 1876; HARP, microfilm reel 46, Wm. P. Craighill, "Report of Operations at Defenses of Baltimore Harbor, Md. during the month of October 1876" November 1, 1876; HARP, microfilm reel 46, Wm. P. Craighill, "Report of Operations at Defenses of Baltimore Harbor, Md. during the month of November 1876," Wm. P. Craighill, December 1, 1876; HARP, microfilm reel 56, "Report of Operations for fiscal year ending June 30, 1877 for Fort McHenry, Baltimore Harbor, Md.," Wm. P. Craighill, [July 1877].

Another report, written in July, mentioned only "A trifling encroachment upon work by the sea in S.W. front."[4]

The first observation was probably the more correct because in March 1879 William Craighill reported that the seawall "has come to be in such a state as to need very extensive repairs, which should not be longer deferred." Craighill believed $2,700 was needed to make the repairs.[5] One month later Craighill was still asking for the money "not exceeding $3,000" and he described the seawall as being "in very bad condition." Craighill reported again in May that "Extensive repairs to sea-wall and elsewhere are needed and will be begun if funds can be had for expenditure in June."[6]

Money was finally appropriated and reparation of the seawall began in June 1879. Craighill thought the repairs were "essential" to protect the seawall from further damage and to stop erosion of the glacis by the sea washing through breaches in the seawall. He described the breaches and repairs:

> The two (2) worst of these,--looking due seaward--aggregating 400 ft in length, have been built up anew from foundations to coping, and the line of wall from "Artillery Stables", S. West angle round to "Sutler's Store" on East face--the part of wall most directly exposed to the seas--besides equal to 892 ft. of wall has been repaired thoroughly.
>
> The plan of repair adopted, has been to level up the top course proper in wall, set on this the large coping stone, in hydraulic cement, grout in their joints, and connect them by heavy iron clamps, let in and counter sunk, in top of stones.

---

4. HARP, microfilm reel 53, Jas. W. Cuyler to Craighill, March 14, 1878; HARP, NA, RG-159, OIG, LR, 1866-1887; Richard Arnold Major 5th Arty to Asst. Adjt Genl. Dept of the East, July 15, 1878.

5. HARP, microfilm reel 35, Craighill to Acting Chief of Engineers, March 31, 1879.

6. HARP, microfilm reel 35, Craighill to Chief of Engineers, April 22, 1879; HARP, microfilm reel 35, "Report of Operations for May 1879," Wm. P. Craighill, May 31, 1879.

Nearly all this work,--practically amounting to rebuilding, that much wall--has been accomplished during the month, since the 9th inst.

55 pieces of granite coping-stone 23 cub yds
61 Tons, have been received

New Coping, 4' Wide & 9" Thick	T. in Ft.
Set in wall	180
Total length of Wall, reset and repaired	1292[7]

In July Craighill reported that the seawall, "which had been in bad repair for several years," had two breaches totaling 400 feet in length made by storms during the winter of 1878-1879. The breaches were repaired during the past month of June and, additionally, "892 lineal feet of wall" from the artillery stalls to the sutler's store were repaired and recoped.[8] In July, 50 feet of wall near the sutler's store received new coping; work which had not been completed at the end of June. Craighill also recommended that the seawall be repaired for the rest of its length, which extended about 1,200 feet.[9]

More repairs were undertaken almost two years later. In April and May 1881 Craighill reported the following work completed:

200 yards of coping of seawall, lineal (about) removed and relaid and underpinned to a greater or less extent.

22 yards, lineal, of coping of seawall removed, relaid, and from one foot in height to one foot six inches of wall rebuilt under it.

---

7. HARP, microfilm reel 35, "Report of Operations for June 1879," Wm. P. Craighill, July 1, 1879.

8. HARP, microfilm reel 35, "Report of Operations for the fiscal year ending June 30, 1879 for Fort McHenry Baltimore Harbor, Md." Wm. P. Craighill, July 1, 1879.

9. HARP, NA, OCE, RWD, RG-77, FB, LR, 1878-86, "Defenses of Baltimore, Md. "Report of Operations for July 1879," Wm. P. Craighill, August 1, 1879; HARP, microfilm reel 53, Capt. Jas. W. Cuyler to Craighill, July 10, 1879.

> 132 lineal yards of coping on sea wall underpinned. 59 lineal feet of the sea wall taken down and rebuilt (57 cubic yards). . . .
>
> 70.5 of coping were removed from the front where the area is being filled in [near new water battery] and used to replace coping broken or washed away of that portion repaired.[10]

Men from Fort McHenry's garrison assisted in the work. The fort's animals hauled sod, coping and the fill, composed of brickbats and stone, used "to back up the portions of the walls where the sea had washed out the earth. . . ."[11] A month-and-a-half later the brickbats and stone placed behind the seawall made "a somewhat rough appearing job." Smoothing over and leveling these sites would require 50 cart loads of ground, according to an estimate, costing $25.00 at $.50 per load.[12]

In mid-June 1881 Lieutenant Colonel Craighill received permission to contract for $600 to be used for repairs to the seawall or otherwise. It is not known if he used these funds for the work just completed or for prospective repairs not mentioned in HARP.[13]

Major Loomis Langdon noted in May 1885 that the seawall needed repairing in front of the center of the water battery. He remarked, "One can detect it by the top moving as you step on it," and he offered a description of the damage:

---

10. HARP, microfilm reel 53, Thomas Turtle to Craighill, April 2, 1881; HARP, microfilm reel 35, "Report for April 1881," Wm. P. Craighill, May 2, 1881; HARP, NA, OCE, RWD, RG-77, FB, LR 1878-86, "Defences of Baltimore, Md. Report of Operations for May 1881," Wm. P. Craighill, June 1, 1881.

11. HARP, NA, OCE, RWD, RG-77, FB, LR, 1878-86, "Defences of Baltimore, Md. Report of Operations for May 1881." Wm. P. Craighill, June 1, 1881.

12. HARP, microfilm reel 53, Thomas Turtle to Craighill, July 12, 1881.

13. HARP, NA, OCE, RWD, RG-77, FB, LS, 1881-88, [George N.] Eliot to Craighill, June 23, 1881.

> Leaning over and looking down one can see the lower third of the wall bulging out. It has settled there and the water, surface drainage has probably undermined it. Base [?] maybe a quick sand there--the place that needs repairing is about 15 yards long--or if not quite that long at least about 15 yards of the wall should be taken down (or up) to get at the foundation.[14]

Langdon thought $300 was enough for the work, "but to be sure I would say $400--and to do it well--sinking a foundation in a trench."[15]

In January 1886 another "severe gale" injured the seawall, "that portion looking toward Fort Carroll. . . ." Two years later even more damage occurred in June when the south end of the unfinished water battery's parapet loosened and slid, nearly throwing the seawall into the water. In reporting the incident in June 1888, Fort McHenry's commanding officer Lieutenant Colonel L. L. Livingston remarked that the seawall needed repair in several places and that the slide damage should be repaired soon to prevent "fishing for stone from the water & loosing a mass of earth. . . ."[16] (See illustrations 7 and 8 for map and detail of the lower battery parapet plan, 1870.)

Albert Mott of the Corps of Engineers offered the following description of the damage and needed repair after inspecting the site of the landslide with Colonel Livingston:

> About one hundred feet in length of the slope of the south end of the unfinished battery has slipped and pressed the sea wall out of line about three feet, and out of plumb about one and one half feet. The slip is the worst that has happened since the battery was constructed. The earth behind the wall even down to the foundation of it has apparently moved the wall out

---

14. HARP, microfilm reel 42, Langdon to "My Dear Colonel," [received at U.S. Eng'r Office, May 19, 1885].

15. Ibid.

16. HARP, microfilm reel 42, E.C. Bainbridge to "My Dear Col" [Craighill], January 8, 1886; HARP, NA, OCE, RWD, RG-77, FB, LR, 1878-86, "Report of Operations for January, 1886," Wm. P. Craighill, February 2, 1886; HARP, microfilm reel 42, L.L. Livingston to "My dear Craighill," June 10, 1888.

> into the harbor bodily. A copious rain would probably cause the slope and wall to be farther thrown into the harbor. It is now dangerous to pedestrians and Col. Livingston has caused signs to be placed near the slip warning people of the danger.
>
> The location of the slip is the same that has twice or more been for want of funds, temporarily repaired by merely filling in at the top of previous slips and sodding it over. . . . The present slip is also partially due to the insufficiency of funds to properly repair the former breaks at the same place. A part of it was repaired and re-inforced, by driving piles in the foundation and filling in a trench dug at the foot of the slope with stone. Funds did not admit of carrying this solid work completely through to the south end of the battery, and so such foundation was at the site of the present landslide. The present slip commences about where the pile and stone foundation ended. . . .
>
> It is almost necessary that the filling in behind the sea wall, should be excavated, and the wall reset on its original line. . . .[17]

Mott estimated permanent repairs would cost $2,750.[18]

Colonel Craighill asked N.H. Hutton of the Corps of Engineers to examine the damage in October. At first Hutton thought the damage to be the result of soil saturation behind the seawall and he proposed sinking two wells behind the terreplain to alleviate the problem. He then changed his mind and thought the wall was undermined and had fallen, thus causing the bank to slip afterwards, "simply because loss of its 'foot hold.'" Hutton recommended taking out the seawall, putting in a new foundation when the seawall was rebuilt, and placing riprap in front of it. Hutton's estimate of repair:

> To repair wall & bank will cost about $700
> To put other places in wall in order about $500
> for all $1200[19]

---

17. HARP, microfilm reel 53, Albert Mott to Craighill, June 15, 1888.

18. HARP, microfilm reel 53, Albert Mott to Craighill, October 2, 1888.

19. HARP, microfilm reel 42, N.H. Hutton to Mr. A. Mott, October 4, 1888; HARP, microfilm reel 42, N. Hutton to "Dear Col" [Craighill], October 9, 1888.

Despite Hutton's lower estimate of repair, the Corps of Engineers went with the earlier, higher estimate and allotted $2,750 to Colonel Craighill for repair of the seawall and the adjacent parapet.[20] Repairs did not begin until the following year.

Hutton kept Craighill apprised of the seawall's condition during the repairs. He found that the "old wall" contained very small stones, that the wall was wretchedly built and that more new stone would be needed than previously thought. An additional concern was the widening of the 27-foot channel off Fort McHenry over the previous two years. Deep water was much closer to the seawall than originally contemplated. Waves from southeasterly storms formerly expended their force on the wide shore in front of the seawall, but were now hitting directly against the seawall. This condition resulted in undermining at the seawall's base, and displacement of coping stones.[21]

Hutton then offered a recommendation for protecting the seawall:

> The wall is built on flagstone generally simply laid on the very hard natural bottom. In order to prevent this undermining action, I recommend rip-rapping the most exposed front.
>
> Many coping stones are out of place & underpinning gone from others--they should all be firmly bedded, cast in cement--as the wall will fail quickly when coping is removed, being largely built of very small stones in the back.[22]

---

20. HARP, microfilm reel 42, Clinton B. Sears to Craighill, November 8, 1888.

21. HARP, microfilm reel 42, Hutton to Craighill, March 16, 1889; HARP, microfilm reel 42, Hutton to Craighill, March 23, 1889.

22. HARP, microfilm reel 42, Hutton to Craighill, March 23, 1889.

Hutton estimated about 300 feet linear of riprap at $1.00 per foot was required to protect the seawall. The total estimated cost was $300.[23]

The Army negotiated a contract with George F. Nardin for repairing the seawall on February 21, 1889. His completion date, originally scheduled for April 30, 1889, was extended to May 31, 1889, due to stormy weather and high tides. The work was delayed through no fault of the contractor.[24]

Continued bad weather forced captain of engineers Thomas Turtle to seek another extension for the contractor to June 30, 1889. A new storm on May 31 and subsequent rains damaged the seawall and water battery slopes even further. According to Captain Turtle:

> The new section of wall seven feet thick by seven feet high has moved out bodily about three inches in center. It is proposed to rip-rap in front of the sea-wall until a weight to balance the pressure at rear is gotten. It is believed to be useless to take the sea-wall down and re-build it, unless an expensive coffer-dam is built and foundations excavated to a depth of six or seven feet. The wall is perfectly vertical but has moved out on a horizontal plane.[25]

Captain Turtle asked that $911.98 designated for Fort Carroll repairs be transferred for the Fort McHenry repairs, and he received $1,000. George F. Nardin's contract now needed supplements to include the additional work to be completed by June 30, 1889.[26] The new

---

23. HARP, microfilm reel 42, "Memorandum of Necessary Repairs," N.H.H. [Hutton], March 23, 1889.

24. HARP, microfilm reel 42, Thomas Turtle to the Chief of Engineers, April 16, 1889; HARP, microfilm reel 42, Hutton to Turtle, May 21, 1889.

25. HARP, microfilm reel 42, Turtle to the Chief of Engineers, May 23, 1889; HARP, microfilm reel 42, Turtle to the Chief of Engineers, June 17, 1889.

26. HARP, microfilm reel 42, Turtle to the Chief of Engineers, June 17, 1889; HARP, microfilm reel 42, Clinton B. Sears to Turtle, June 21, 1889.

section of the seawall stopped moving by June 22 and repairs to the slopes and seawall were underway by July 19, 1889.[27]

At this point the historical record becomes confusing because no mention of Nardin completing his contract on June 30, 1889, was found. In August Colonel Craighill submitted an estimate of $1,986 to be used that month "in payments on contract for repair of water battery and seawall at Fort McHenry, Md. and for repairs to drains to the same work in September."[28] Perhaps these funds were used to pay Nardin's contract. However, references to repairs appear after June 30, as seen above, and Nardin signed another contract to repair the seawall in October. Perhaps the first contract focused on the initial slip damage while the subsequent storm damage of May 31 was repaired under the second contract.

On August 20 N.H. Hutton identified even more problems with repairing the seawall. Refilling "dangerous holes" in the seawall "near the Low Water line, and East of old Post Traders house," could not be done until the fall during low water season. Four hundred dollars were needed for these repairs. A few days later Colonel Craighill noted that "much of the dry underpinning put in many years ago, needs replacement in order to prevent the falling of considerable portions of the wall. . . ."[29]

The seawall was repaired once again under contract in 1889. The job was advertised on September 24, two bids were received, and George F. Nardin's bid was the lowest. Approximately $1,500 was to

---

27. HARP, microfilm reel 42, Hutton to "Dear Sir" [Turtle], June 22, 1889; HARP, microfilm reel 56, Turtle to the Chief of Engineers, July 19, 1889.

28. HARP, microfilm reel 56, Craighill to the Chief of Engineers, August 29, 1889.

29. HARP, microfilm reel 42, Hutton to Craighill, August 20, 1889; Craighill to the Chief of Engineers," August 26, 1889.

be spent. Once again the record is unclear; no contract completion date was found. Furthermore, on October 28, Hutton advised "removing the upper half of seawall recently built, at end of exterior battery, and rebuilding it in a straight line, merely as a matter of 'looks', the cost would not exceed $150. . . ." It seems that Hutton's observation concerns the bulging seawall and that this work should have been covered by Nardin's contract. Obviously the bulging wall was not covered under the contract and was not repaired. Perhaps the contract only included placing riprap and repairing holes. At the end of November Colonel Craighill noted, "Work here is entirely suspended except a small amount of repairs to the sea-wall at Fort McHenry which is done by a contractor who is paid by the cubic yard, he furnishing all men and materials." This implies no major seawall rebuilding occurred. Hutton wrote in January 1890 that "Work at Fort McHenry is completed tho' not measured yet entirely," and it is probable this work was the seawall repair. In April Colonel Craighill had $1,000 left over from Preservation and Repair of Fortifications appropriations of September 22, 1888, and March 2, 1889. He remarked that repairs of the seawall and water battery parapet cost less than estimated.[30]

Evidently all the repair work was completed; no mention of the seawall appears again until June 1892 when Colonel Craighill requested funds for placing riprap at the foot of the seawall at the westerly end of the exterior water battery. No action was taken, for Craighill still sought the money in October, this time urging, "As this work requires men to be in the water much of the time, it may be considered an

---

30. HARP, microfilm reel 56, Craighill to the Chief of Engineers, August 29, 1889; HARP, microfilm reel 42, Craighill to The Chief of Engineers, October 16, 1889; HARP, microfilm reel 42, Hutton to Craighill, October 28, 1889; HARP, NA, RWD, RG-77, LS, BDO, 1878-1900, Craighill to Malcolm A. Black, November 30, 1889; HARP, microfilm reel 42, Hutton to Craighill, January 17, 1890; HARP, microfilm reel 56, Craighill to The Chief of Engineers, April 5, 1890.

emergency and I request authority to proceed with it at once by hiring men for the purpose, as the season is advanced."[31]

Twenty-five dollars was available for "replacing riprap at bulge of seawall at Fort McHenry." This statement again confirms that the riprap was being replaced and that the bulging wall had not been repaired in 1889. Both Craighill and Hutton wanted to get started on the work immediately, but they had to wait until a "N.W. wind gives lower tides than now prevail." The wait lasted until the following year. Because of inclement weather all fall, winter and spring the work had not yet been started by April 1893. Craighill thought the work could be finished before the end of June. Although no completion reports were found, the $25 was still available in June, and it is assumed the riprap repairs were completed.[32]

Another storm on August 28, 1893, destroyed the wharf, damaged earthworks and "carried away" extensive sections of the seawall. Craighill estimated repairs would cost $2,500. His estimate had to be revised upwards in October because another "severe gale" on the 13th did even more damage.[33]

Fort McHenry's commanding officer Major George B. Rodney described both the storms and the seawall's condition:

---

31. HARP, microfilm reel 56, Craighill to Brig Gen Thomas Casey, June 24, 1892; HARP, microfilm reel 42, John G.D. Knight to Craighill, October 6, 1892; HARP, microfilm reel 42, Craighill to Casey, October 7, 1892.

32. HARP, microfilm reel 56, Craighill to Hutton, October 11, 1892; HARP, microfilm reel 42, Hutton to Craighill, October 12, 1892; HARP, microfilm reel 56, Craighill to Casey, April 12, 1893; HARP, microfilm reel 42, John G.D. Knight to Craighill, June 26, 1893.

33. HARP, microfilm reel 42, R.P. Strong to the Assistant Adjutant General, August 30, 1893; HARP, microfilm reel 56, Craighill to Casey, September 7, 1893; HARP, microfilm reel 56, Craighill to Casey, October 20, 1893.

> The sea wall which was badly damaged by the storm of August 28th was still further damaged and several sections measuring from twenty to thirty feet in length have been opened. The opening made in the sea wall by the storm of August 28, has been increased in dimensions, the opening now measuring about seventy five feet in length and is nothing more than an open beach. The tide rose some three feet above the sea wall from a point near the old wharf on the north side of the reservation, around the south side, almost to the cemetery, which was badly washed along its water front. If we should have one or two more such storms during the coming winter the sea wall for over a hundred yards on the south side will be destroyed.[34]

Colonel Craighill received $2,000 and repairs were underway, but by December 7 they were stopped for the winter. In the spring of 1894 Craighill placed advertisements in public places inviting proposals for building materials needed for the seawall repair.[35] Two proposals were accepted on May 15 and 16. George F. Nardin of Baltimore County was to supply the following materials:

300 bus. Clean Sand @ 6 cts per bushel	$ 18.00
100 ft. 4 inch Coping, 3 feet wide @ 85 cts per foot	85.00
75 perches Stone, @ $2.85 per perch	176.25
	$279.25

Delivery of materials was to start on May 21.[36] Craighill also accepted the following proposal for materials from Maryland Lime and Cement Company of Baltimore: "50 Bbls cement (Anchor Rosedale) @ $1.00 per bbl.--Total $55.00. . . ."[37]

---

34. HARP, microfilm reel 42, Geo. B. Rodney to the Assistant Adjutant General, October 20, 1893.

35. HARP, microfilm reel 42, Knight to Craighill, November 1, 1893; HARP, microfilm reel 56, Craighill to Casey, December 7, 1893; HARP, microfilm reel 56, Craighill to Casey, May 3, 1894.

36. HARP, microfilm reel 56, Craighill to Geo. F. Nardin, May 15, 1894.

37. HARP, microfilm reel 56, Craighill to Maryland Lime & Cement Co., May 16, 1894.

Repairs were started with the $2,000 allotment but by June 30, 1894, they were suspended for want of funds.[38] No completion date for the work was found in HARP.

Between the years 1876 and 1893 the seawall suffered damage time and time again from the stormy weather and high waves. Repairs remained crucial for the seawall protected the point and the fort from serious washing. On several occasions previous damage was only made worse by recurring storms even before repairs could be started. The seawall demanded constant reparations throughout its history, as did all the fortifications on Whetstone Point.

2. Dry Dock and Landfill

In 1878 changes were being discussed for the northwest corner of the military reservation--changes which affected the seawall's configuration. The Army planned to cede three acres of Fort McHenry property to several local citizens for a dry dock. In addition, the waterfront adjacent to the ceded tract would be filled to the "Port Warden's Line" which would add eight and one half acres to the reservation. Deducting the acres for the dry dock, the reservation would increase five and one half acres. Since the fill would be ballast dumped by ocean steamers the only cost to the Army would be the construction of an outer seawall or bulkhead. The issue was brought to the secretary of war's attention in 1879, when the chief of engineers proposed filling in to the port warden's line, thus extending the drill ground, and building a new seawall.[39] (See illustration 9 for 1878 map of proposed boundary change.)

A year later Major William Craighill proposed driving a few piles to indicate the dumping limits since the fill would be placed in front

---

38. HARP, microfilm reel 56, Craighill to Casey, June 30, 1894.

39. HARP, NA, OCE, Land Papers, R.B. Marcy to General E.D. Townsend, March 4, 1878; HARP, H.D. 46th Congress, 2d Session, House of Representatives, Ex. Doc. 1, Part 2, Vol. 3., 1879-80, "Report of the Chief of Engineers," October 20, 1879.

of the existing seawall. In February 1880 Craighill sought authority to receive and pile large quantities of ballast which was constantly arriving at the fort and which could be had for no expense. Not only did Craighill hope to obtain fill from ballast, but also dredging material from the builders of the dry dock.[40]

By the next month material dredged from the adjacent dry dock was being dumped at Fort McHenry. Colonel Craighill reported that the dry dock contractors continued dumping "on the site between the existing seawall and the prescribed Port Warden's line" through the spring, and by April a bulkhead of ballast had been made along a line in front of the site and "at a distance from the authorized pier line of 375 feet." Colonel Craighill also reported that a line had been established in "the rear of the site at the same distance from the pier line." Craighill proposed "to deposit in the area" ship ballast and other materials dredged from the upper part of the Patapsco channel concurrent with channel improvements for Baltimore.[41]

At the end of May 1880 the dry dock contractors stopped dumping their excavated materials at the site. By July 1, the dry dock was completed and was being used. Colonel Craighill once again recommended building a seawall along the line of the temporary bulkhead.[42]

---

40. HARP, NA, OCE, Land Papers, "List of Papers Herewith" February 24, 1880; HARP, NA, OCE, RWD, RG-77, RB, LR, 1878-86, Craighill, Maj W.P., February 16, 1880; HARP, NA, OCE, RWD, RG-77, FB, LR, 1878-87, Craighill, Major W.P., February 25, 1880.

41. HARP, microfilm reel 35, "Report of Operations for March 1880," Wm. P. Craighill, March 31, 1880; HARP, microfilm reel 35, "Report of Operations for April 1880," Wm. P. Craighill, May 1, 1880.

42. HARP, microfilm reel 35, "Report of Operations for May 1880," Wm. P. Craighill, June 1, 1880; HARP, NA, OCE, RWD, RG-77, RB, LR 1878-86, "Report of Operations for the fiscal year ending June 30, 1880 for Fort McHenry Baltimore harbor," Major Wm. P. Craighill, June 30, 1880. Congress had granted permission to an incorporated dry dock company to build the dry dock, located on government property.

Even though the dry dock was finished and dumping from that operation discontinued, ballast was still deposited "in front of the site" and material dredged from the Patapsco was dumped "behind the site." Dumping in front of the seawall continued through the summer and fall of 1880 and into the spring of 1881. By May, the filling process had slowed because of a scarcity of vessels coming in to dump ballast. Evidently this problem continued for the next several years. In June 1882 proposals were made to rebuild the wharf, which was in poor condition, and to move it next to the works of the Dry Dock Company. Colonel Craighill still expected to "fill out solidly to the authorized 'Bulkhead line' with ballast, and then to construct an abutment and timber pier. . . ."[43]

By mid-1885 the filling was not yet finished. Craighill reported little progress had been made because of the few vessels depositing ballast. Once again Craighill requested the wharf be removed and a new one built near the dry dock, and that a seawall be built along the temporary bulkhead line.[44]

No further references to the filling were found. It is not known when the dumping of ballast stopped, but requests to build a new seawall in front of the fill continued into the late 1880s and early 1890s.

---

43. HARP, microfilm reel 35, "Report of Operations for June 1880," Craighill, June 1, 1880; HARP, microfilm reel 35, "Report of Operations for July 1880," Craighill, July 31, 1880; HARP, microfilm reel 35, "Report of Operations for August 1880," Craighill, September 1, 1880; HARP, microfilm reel 35, "Report of Operations for September 1880," Craighill, October 1, 1880; HARP, microfilm reel 35, "Report of Operations for October 1880," Craighill, November 1, 1880; HARP, microfilm reel 35, "Report of Operations for November 1880," Craighill, December 1, 1880; HARP, microfilm reel 35, "Report for March 1881," Craighill, April 1, 1881; HARP, NA, OCE, RWD, RG-77, FB, LR, 1878-86, "Report for April 1881," Craighill, May 2, 1881; HARP, NA, RWD, RG-77, OCE, LS, Fortifications, January 1881 - November 1884, Craighill to General Wright, June 30, 1882.

44. HARP, microfilm reel 35, "Annual Report, Fort McHenry." Craighill, June 30, 1885.

3. Health Concerns

One side effect of the construction on the northwest corner of the military reservation was a concern about sanitation. In 1875 a beach rapidly formed along the seawall from the wharf to the seawall's "termination on the west." The post surgeon noted the beach was covered by very high tides and was a collector of trash and filth from both the harbor and the garrison. In the surgeon's opinion the beach neutralized the sanitary benefits of the seawall. He also believed a log boom belonging to the Baltimore and Ohio Railroad which encroached on the reservation's waterfront assisted in forming the beach.[45]

Major William Craighill responded to the surgeon's concerns. In his estimation the seawall, "built about 40 years ago" had served its purpose well. He disagreed that the size of the beach had rapidly increased. On the contrary, very little beach existed at all, and what did exist was formed by the garrison constantly throwing matter over the wall. This served as a "nucleus" for gathering other matter moved by "the influence of winds, waves and currents." Beaches were constantly increasing and decreasing. In Craighill's estimation, the effect of the B & O Railroad's log boom was minimal in terms of forming a beach or stagnating the water. No money was available for "changing the position of the sea-wall, but it is my opinion that it should someday be carried out considerably, for the purpose of giving more room for drilling and for buildings."[46]

Five years passed but the question of sanitation emerged again after the filling commenced. In 1880 another surgeon asked what effect the filling had on the garrison's health and Craighill again responded. He explained that the fill consisted of ship ballast, dry dock excavations and oyster shells from packing houses in Baltimore. The

---

45. HARP, microfilm reel 46, D. Bache to Post Adjutant, May 31, 1875.

46. HARP, microfilm reel 46, Craighill to Brigadier General A. A. Humphreys, July 13, 1875.

work was done carefully, and no matter was placed above the water line which could pose a sanitation problem. In Craighill's opinion disagreeable odors came not from the fill, but from slop and other matter poured into the drains at the soldiers' barracks.

Craighill did admit the space along the old seawall was out of the current and did collect "floating bodies, such as those of dead dogs, cats, &c." This situation was made worse since the Dry Dock Company made a large filling which cut off the current. But Craighill believed the new bulkhead and the filling helped alleviate the problem. "The tide ebbs and flows regularly in the enclosed space not filled."[47]

Further sanitation concerns connected to the seawall involved the placement of privies. Several references appear in the 1870s and 1880s which mention the problems associated with this type of plumbing. Four mens' sinks, or privies, were located on the seawall in the early 1870s, but they were not "built sufficiently far out to secure removal of the excreta by the tide."[48] In January 1885 Lieutenant Colonel Loomis L. Langdon discussed engineering work to be done at Fort McHenry and mentioned the need for a water closet for the engineer workmen. He wanted to have a substantial cesspool built with masonry, brick and cement. Langdon's reason for such an expenditure and change from past practice reveals a slice of social life at the fort: "I do not like to put it [the water closet] on the sea-wall where it stood years ago, for that sea-wall is the only promenade the ladies here have left."[49]

---

47. HARP, NA, OCE, Land Papers, Craighill to Brig. Genl. H.G. Wright, December 22, 1880.

48. HARP, microfilm reel 45, "Reports of Surgeons J. Simpson and D. Bache," circa 1870-1874 [?]. See also pp. 68-69 of Thompson, HSR, for references to seawall privies.

49. HARP, microfilm reel 42, "Programme of Engineer Work to be done at Fort McHenry, Md prior to the first day of July 1885," Loomis L. Langdon, January 29, 1885.

Not only did the seawall protect the Fort McHenry grounds from washing away, it also protected the fort's garrison from disease by keeping washed debris from accumulating on the property. When used properly, the privies on the seawall provided as healthful conditions as possible at the time because refuse was regularly washed away. However, questions were raised concerning possible unsanitary conditions generated by the fill in front of the seawall and the proper location of the privies. One can only sympathize with the women and men who, perhaps on their daily walks, had to make wide berths around offensive areas on or next to their "promenade"--the seawall.

4. Threat to Seawall from Miners

The seawall suffered more threats than those presented by the weather and tides. Some of them were caused by people. In 1873 Colonel Craighill worried about the "pickers-up of ore" who were operating within 30 feet of the seawall. A Mr. Murdock and others disregarded regulations keeping them 30 feet away and were at the seawall's "very foot." Craighill remarked, "It would serve some of them right if the wall would topple over on them."[50] No further identification of these ore miners was found.

Ten years later in May 1883 Craighill learned that iron miners in the Patapsco near the seawall were throwing mud and rock refuse into the water where they worked. Recently they had come onto the fort's grounds and "threw into the water some dirt which the Post Trader had excavated in putting up his building and which he had placed over the loose bricks piled in rear of the sea wall as a support to it."[51] Thomas Turtle inspected the locality where the iron ore miners were searching and he advised Craighill, "if the United States has any rights in the matter they ought to be asserted, and the sooner the better." So

---

50. HARP, microfilm reel 56, Craighill to Major Genl. W. H. French, November 15, 1873.

51. HARP, microfilm reel 53, H.G. Gibson to Craighill, May 23, 1883.

far as Turtle could see no injury had yet been done to the defenses or to the seawall, but placing even temporary mining structures posed the possibility they would be difficult to move or to limit.[52]

In September 1883 a Charles Wroten applied to mine within 10 feet of the seawall's face. Thomas Turtle thought this distance was too close especially because no depth limit was mentioned. Turtle's concerns were based on the seawall's construction:

> A portion of one face of the sea wall is built upon a very unstable sand and has already on that account been taken up and rebuilt. Such working as Mr. Wroten proposes would in my judgement result in the shaking of this foundation again and necessitate the rebuilding of that portion of the wall for the second time. . . .[53]

No documentation was found regarding the Army's decision in this matter. Regardless, the episodes reveal that iron mining occurred in the river within 30 feet, and possibly as close as 10 feet, of the seawall, a portion of which stood on unstable sand. The engineers recognized the seawall's weaknesses and strove to prevent inadvertent damage by the miners.

Fort McHenry's seawall withstood a relentless battering caused by wind and waves. The army engineers' attempts to keep the seawall in good repair are worthy of admiration when considering the monetary requirements and the accompanying race against time--fixing sometimes major damage before another storm engulfed the point. The various descriptions of repair reveal the techniques used to fix the seawall, the costs involved and materials utilized. The engineers sometimes made repairs only for as long as the money lasted. Even though many details of the repairs, especially references to location, were

---

52. HARP, microfilm reel 53, Thomas Turtle to "Colonel" [Craighill], May 29, 1883.

53. HARP, microfilm reel 53, Turtle to "Colonel" [Craighill], September 6, 1883.

not found in the engineers' writings, a general picture does emerge; one of repair as frequent as the change of seasons. But when compared to the seemingly endless work required to keep up the fortifications themselves the seawall probably did not require any more attention.[54] As long as it was kept in good order the seawall performed its task of keeping the grounds' perimeter free of debris and encroachments by the surrounding water.

---

54. See Thompson, HSR, pp. 89-118.

D. Third Stage Construction 1894-1897

1. Requests to Protect Cemetery and South Front

Requests to extend the seawall on the south side, especially in front of the cemetery, occurred throughout the 1870s and 1880s, often in conjunction with requests for a seawall extension on the northwest front to protect the new filled acreage. (See illustrations 10 and 11 for 1870 proposal to build seawall.) In 1870 an inspection of Fort McHenry revealed that the sea was "encroaching on the work" and that a seawall was needed to protect it. There is confusion, however, over the inspection report the following year. The inspector wrote in April 1871, "A new wharf and seawall has been built at this post since my last inspection."[1] Because no information was found in HARP detailing any seawall construction between 1839 and 1894, the meaning of this remark is not known. Perhaps the inspector referred to repairs of the seawall which occurred the previous year, even though no mention of seawall repair in 1870-1871 was found either. (See Chapter C, section 1.)

In August 1884 Colonel Loomis Langdon complained that bay waters had cut away the bank "where the sea-wall ends, down by the bake house, just at the point where I had built a platform, the 200 yard firing point." Langdon tried to halt the erosion by throwing ashes, collected every morning at the post, on the site, but he admitted to the futility of the effort. In his view, "The better plan would be to continue the sea-wall all the way around." Langdon thought he could build a few yards of the wall with materials stored at the fort. If no wall were started, Langdon even suggested "piling in there all that old pile of concrete stone that lies in a great pile on the right of the road to the Sutler Store." The material would still be available if needed for another project, and Langdon would use "ashes and refuse to fill up the holes

---

1. HARP, NA, RG-159, OIG, LR, 1866-1889, "Post of Fort McHenry, Commanded by Brevet Brig General Horace Brooks, Inspected April 28th, 1870"; HARP, NA, RG-159, OIG, LR, 1866-1889, "Post of Fort McHenry, Md., Commanded by Colonel Horace Brooks 4th Artillery, Inspected April 20th, 1871."

that were made by getting out dirt beyond the cemetery for the Water Battery."[2]

Evidently no action was taken on Langdon's offers for in January 1885 he still sought permission to fill in the erosion or build the seawall. He wanted the "sea-wall down by the bake-house [to] be prolonged northerly." In addition to the material piled alongside the road for fill, Langdon suggested using material "consisting of the old sea-wall east of the barracks half buried in the sand. . . ." Before he would begin the work, he would have an exact line laid out by someone from the engineer's office. Langdon thought the work a necessity because the sea was making "inroads" at the site.[3] (See illustration 12 for location of bakery and barracks in 1888.)

Langdon's suggestions concerning the need for a seawall on the point's southern side were contained in a program of engineering work to be done at the fort and this program was approved. Despite this, in May Langdon again requested the work be done. The need for the wall, he thought, was not so much for protection from the sea, but for protection from the heavy rains washing down the banks. Langdon thought it a matter of time before the whole bank washed down. Once again, Langdon urged that material from the old seawall buried in the ground behind the men's quarters be used for a new seawall. Labor was the only expense: $1,680 for 20 laborers at $1.50 per day for 56 days. Langdon thought the cost was "A pretty big item--but I think essential to the well being of the place."[4]

---

2. HARP, microfilm reel 42, Langdon to "My Dear Mr. Mott," August 12, 1884.

3. HARP, microfilm reel 42, "Programme of Engineer Work to be done at Fort McHenry, Md. prior to the first day of July 1885," Langdon, January 29, 1885.

4. HARP, microfilm reel 42, Langdon to "My Dear Colonel," February 1, 1885; HARP, microfilm reel 42, Langdon to "My Dear Colonel," [received at U.S. Eng'r Office, May 19, 1885].

Five years passed and estimates for protecting the cemetery site were still being developed. One estimate suggested building a retaining wall 75 feet long, 10 feet high, four feet wide with a foundation one foot below low water at a cost of $470.[5]

Three years later Fort McHenry's commanding officer, Major George B. Rodney, still sought the seawall's extension because a storm on October 13, 1893, "washed" the grass at the post cemetery and badly exposed some graves. An estimate in December to grade and fill ground in the rear of the cemetery and the adjacent slope included 5,000 cubic yards of earth and shell filling at 50 cents, totaling $2,500.[6]

Eight months later, in August 1894, engineer N.H. Hutton thought the most serious injury to the site requiring immediate attention was the front of the cemetery. "At this point, the erosion has been such as to expose the contents of the graves." Hutton's estimate for protecting the cemetery was:

> To build a protective wall and grade the ground to proper slopes for stability will cost $3100 that is
>
> | | |
> |---|---|
> | 150 c.y. rip rap @ $3 1/2 in place | $ 525 |
> | 150 " dry wall @ $5 " | $ 750 |
> | 200 ft coping @ $ 1/2 " | $ 300 |
> | 5000 c.y. excavation & embankment @ 30 | $1,500 |
> | Contingencies | $ 25 |
> | Total | $3,100[7] |

5. HARP, microfilm reel 42, Chas. Y. Woodward to Craighill, June 1, 1890; HARP, microfilm reel 42, [?] to Woodward, June 12, [1890].

6. HARP, microfilm reel 42, Maj. Geo. B. Rodney to Craighill, November 19, 1893; HARP, microfilm reel 42A, Hutton to Craighill, December 6, 1893.

7. HARP, microfilm reel 42, Hutton to Craighill, August 13, 1894. Hutton also included an estimate to build a seawall along the "whole front," 1043 ft. in length. This estimate probably refers to the seawall on the northwest front. Hutton provided dimensions but they are also probably for the northwest seawall rather than the south front seawall. The October 13 storm uncovered the grave of an officer whose remains were reburied. HARP, microfilm reel 56, Craighill to Brig Genl Thomas L. Casey, June 30, 1894.

Hutton's final thought was that "The cemetery should, at all means be protected."[8]

A little more than a month later an allotment of $3,100 was granted for the work. William Craighill hoped that the construction of a section of seawall behind the cemetery would be "the beginning of a wall all along the rear."[9]

2. Building Seawall Behind Cemetery

The Army engineers went ahead with plans to extend the seawall below the cemetery on the south front of the fort's grounds. Colonel Craighill had advertisements placed in the Baltimore Sun and Daily News October 4, 1894, seeking proposals for building a seawall. The bids were opened on October 20; George F. Nardin was chosen as contractor and his contract was dated October 25, 1894.[10]

Problems arose within the month. Fort McHenry commander Major George B. Rodney objected to the contractor's use of the road and wharf for transporting materials. If Colonel Craighill had known this was a problem he would have procured an order from Washington but under the circumstances he asked Rodney to allow the contractor "repairing the wall behind the cemetery" the use of the road and wharf. In view of Rodney's opposition, George Nardin agreed to pay one half the cost for any damage done to the wharf or roads occurring during work under contract. Any such expense would be deducted from money due Nardin as liquidated damages.[11]

---

8. HARP, microfilm reel 42, Hutton to Craighill, August 13, 1894.

9. HARP, microfilm reel 42, John G.D. Knight to Craighill, September 25, 1894; HARP, microfilm reel 56, Craighill to Rodney, October 2, 1894.

10. HARP, microfilm reel 56, Craighill to Chief Clerk, War Dept., October 4, 1894; HARP, microfilm reel 56, Hutton to Casey, October 20, 1894; HARP, microfilm reel 42, Geo. W. Goethels to Craighill, November 13, 1894.

11. HARP, microfilm reel 42, Craighill to Rodney, November 15, 1894; Geo. F. Nardin to Craighill, November 15, 1894.

George Nardin began work on November 9 but by December 17 he sought an extension of 60 days for the completion of his contract. He explained, "The work was delayed for some time by reason of high tides preventing me from digging the foundations through the hard clay." Engineer Hutton examined Nardin's request and noted the contractor had lost 16 work days to the "unusual" high tides of November and December. During these months northwest winds usually produced low tides, but this year the winds were southerly and southeasterly, which produced the high tides. Hutton did not see any advantage to having Nardin stop work and resume in the spring because "the liability to high tides would then be increased." Two or three days of westerly winds would allow Nardin to work above the tide's influence, and Hutton recommended the extension of 30 days be granted.[12]

Craighill granted Nardin a 60-day extension--20 days with no expenses deducted for inspection and supervision and 40 days more with the expenses of inspection and supervision to be deducted from Nardin's payments. The work continued and in December Nardin hauled stone from the Falls' Road during good weather. By December 24 all the foundation was in and about 80 feet of seawall three feet high built.[13]

Two months passed and Nardin had placed 150 cubic yards of riprap, 100 cubic yards of masonry, and 358 cubic yards of earth filling. Evidently the work then stopped for some reason, possibly weather, for on March 24 Craighill asked Nardin to resume work on the seawall by April 1. Craighill added, "The drain pipe from officer's

---

12. HARP, microfilm reel 56, Craighill to Casey, January 4, 1895; HARP, microfilm reel 42, Nardin to Craighill, December 17, 1894; HARP, microfilm reel 42, Hutton to Craighill, December 18, 1894.

13. HARP, microfilm reel 56, Craighill to Nardin, January 2, 1895; HARP, microfilm reel 42, Hutton to "Dear Sir," [Craighill], December 24, 1894.

quarters which was broken last fall, must be repaired by you at the earliest opportunity."[14]

George Nardin completed his contract on May 11, 1895, having built 227 feet of seawall below the cemetery. Even as he finished his work, plans were underway to extend the seawall along the entire south front of the Fort McHenry reservation.[15]

3. Building Seawall on South Front

Engineer Hutton proceeded with plans to extend the seawall along the entire southern front and he wanted a new drawing of the seawall made and specifications developed for prospective bidders. When Craighill sent the specifications to the secretary of war he included the stipulation that the contractor be responsible for the condition of "all wharves, roads, and parts of the ground on reservation" used during the work's progress.[16]

The work was advertised on March 28, 1895, and bids opened on April 30. Nine bids were received and Albert Weber won the contract, dated May 4. Weber began work but soon suffered the same problems which had plagued Nardin. At the end of July Weber sought an extension of his contract to August 5, because of extraordinary high tides. His request was granted and a new completion date was set for September 30, 1895.[17]

---

14. HARP, microfilm reel 42, Hutton to Craighill, February 19, 1895; HARP, microfilm reel 56, Craighill to Nardin, March 24, 1895.

15. HARP, "Report for year ending June 30, 1895," Colonel Peter C. Hains, [July 1895].

16. HARP, microfilm reel 42, Hutton to Craighill, March 24, 1895; HARP, microfilm reel 56, Craighill to Rodney, March 28, 1895.

17. HARP, microfilm reel 56, Craighill to Casey, April 30, 1895; HARP, microfilm reel 56, Craighill to Albert Weber, April 30, 1895; HARP, microfilm reel 42, H.M. Adams to Craighill, May 1, 1895; HARP, microfilm reel 56, Craighill to Casey, May 7, 1895; HARP, microfilm reel 42, Adams to Craighill, May 13, 1895; HARP, microfilm reel 42, Peter C. Hains to Craighill, July 31, 1895; HARP, microfilm reel 56, Hains to Weber, August 5, 1895.

At mid-September the filling-in behind the new seawall was almost completed and bare ground was soon to be covered with "street sweepings" or other material for growing grass. The final estimate (dated September 20) of Weber's completed work included the following materials and costs:

Total work done:	
Rip-rap foundation:	
794 ft. by 10 ft by 1 ft = 294 c. yds @ $2.24	$ 658.56
Dry Wall:	
814 ft @ 22 3/4 sq. ft. per foot, or 685.85 c.y. @ $3.62	$2482.77
Coping 6" x 3 ft in cement	
812 ft @ $1.95 per ft	$1583.40
Earth filling	
4.322 c.y. @ $.25 per yd.	$1080.50
Total value of work done	$5085.23[18]

Albert Weber finished the last section of the seawall by September 19, 1895, and completed his contract. Engineer Hutton submitted a final estimate of Weber's work to Colonel Peter C. Hains of the Corps of Engineers on September 23. This supplement to the September 20 estimate included the following work completed since August 27:

95.85 c.y. masonry in Wall @ $3.62	$ 346.97
112 linear ft 6" 36" coping @ $1.95	$ 218.40
36 c.y. rip rap foundations @ $2.24	$ 80.64
3322 c.y. earth filling @ $.25	$ 830.50
or in all	$1476.51
to which must be added retd: %	$1132.87
making due him now	$1909.38
previous payments	$3895.88
making total as per estimate of 21st	$5805.23[19]

18. HARP, microfilm reel 42, Hutton to Hains, September 14, 1895; HARP, microfilm reel 42, Hutton to [Engineers Office, Baltimore], September 20, 1895.

19. HARP, microfilm reel 42, Hutton to Hains, September 20, 1895; HARP, microfilm reel 42, Hutton to Hains, September 23, 1895. Hutton submitted the September 20 estimate on the 21st and mentions this in his September 23 letter.

4. Requests to Extend Seawall on Northwest Front

After the temporary bulkhead was established and land filled on the northwest side of the Fort McHenry reservation, site commanders continued to request a permanent seawall be built to contain the fill. By 1892 the agent of the Baltimore & Ohio Railroad wanted to place even more ballast fill inside the bulkhead of oyster shells. This action would help fill the "disagreeable if not unhealthy quasi-lake" existing at the site. The requests for the seawall continued throughout the early 1890s.[20]

In December 1893 engineer Hutton estimated the seawall extending "from its present terminus, on the Western face of Reservation, to the north boundary wall" would require 2,300 cubic yards of dry stone masonry at $6 totalling $7,800 and 1000 feet 6" coping at $1 totaling $1,000.[21] (See illustration 13 for diagram of conditions at northwest front in 1893.)

Eight months later Hutton submitted another estimate to Colonel Craighill. In addition to estimating the cost of a retaining wall on the south side to protect the cemetery, Hutton offered the following figures for a seawall to protect the "whole front," 1043 feet in length:

600 c.y. rip rap in place @ $3 1/2	$ 2100
700 " dry wall " " @ $5	$ 3500
1050 ft. coping @ $1 in place	$ 1050
25000 c.y. excavation & embank @ $25	$ 6250
Total	$12900[22]

William Craighill reported Hutton's estimate to Chief Engineer Thomas L. Casey and remarked that the entire western face of

---

20. HARP, microfilm reel 56, "Report for year ending June 30, 1889, [July 1889?]; HARP, microfilm reel 56, "Report for year ending June 30, 1889," [July 1890?]; HARP, microfilm reel 42, Jas. Gales Ramsey Craighill, June 2, 1892; HARP, microfilm reel 56, "Report for year Ending June 30, 1892," [July 1892?].

21. HARP, microfilm reel 42, Hutton to Craighill, December 6, 1893.

22. HARP, microfilm reel 42, Hutton to Craighill, August 13, 1894.

the property was entirely unprotected from the waters and had suffered undermining. Craighill told Casey that 1045 feet of seawall would cost $12,900.[23]

The Army took no action until 1895. An estimate was then made as to required materials and cost for completing the filling which had occurred over the years:

Sea Wall North Front	
660 ft. linr wall @ $7.50 per foot	$ 4,950
35,000 c. yds. filling @ $.20	$ 7,000
3000 sq. yds. graded sod @ $.50	$ 1,500
100 trees @ $3 (planted)	$ 300
Total	$13,750

The fill, sod, and planted trees were needed to "complete an addition to the grounds constructed long ago, and now in an unsightly condition on the most exposed front of reservation." The trees were needed to screen the barracks latrines.[24] Colonel Peter Hains relayed the estimate to Chief Engineer William Craighill, who approved it. Hains was to use an allotment currently in his hands, as far as it would go, for portions of the work.[25]

5. Building Seawall on Northwest Front

Colonel Hains received another allotment the next year, in July 1896, of $13,750 for the seawall and embankment. Bids were made and opened, and the firm of Nardin and Anderson chosen for the work by August. (See appendix A for the seawall contract.) Nardin and Anderson's contract, dated August 17, 1896, was for "building a sea-wall and making repairs at Fort McHenry, Md." Two rowboats were hired to

---

23. HARP, microfilm reel 56, Craighill to Brig. Genl. Thomas L. Casey, August 16, 1894.

24. HARP, microfilm reel 42, Hutton to Col. P.G. Hains, September 10, 1895.

25. HARP, microfilm reel 42, Hains to Craighill, September 14, 1895; HARP, microfilm reel 42, Craighill to Hains, October 17, 1895. Craighill replaced Casey as chief engineer in May 1895.

assist with the work. In October Nardin and Anderson proposed further work on the refill in back of the old seawall, in addition to their contract work on the new seawall. The firm offered to remove and replace the soil after refilling, plus furnishing and sowing grass seed over the refill at a cost of 45 cents per cubic yard. Colonel Hains accepted the offer.[26]

Work was still underway in December 1896 when the contractors broke the sewer pipe "near where it joins the original one which carries off the sewerage of the post, also that the original one is broken where they took up the stones from the old wall, which has caused the flooding of that part of the post." Evidently the task of removing the old wall and its associated problems only added to the contractors' woes, because Nardin and Anderson asked for an extension of their contract in December. Owing to high tides, rain, and "more earth than our first understanding," the contractors were unable to finish the embankment's top dressing in time. Not knowing how soon they would have to stop work because of frost, Nardin and Anderson asked that their contract be extended from January 1 to April 1, 1897. Their request was granted.[27]

A year-end financial statement for operations at the fort revealed details of the seawall's construction:

Total Riprap 1846.5 cu yds @ 1.49	$ 2,751.28
" Earth and Shell Fill 29562 cu yds @ 0/24	7,094.88
" Masonry for Sea Wall 410.5 cu yds @ $6.00	2,463.00
Coping laid 528 linear ft. @ 1.50	792.00
Total cost of work to Dec. 31st '96	$13,101.16

26. HARP, microfilm reel 42, Craighill to Hains, July 1, 1896; HARP, microfilm reel 42, Craighill to Hains, August 26, 1896; HARP, microfilm reel 42, Hains to Craighill, September 5, 1896; HARP, microfilm reel 56, Hains to Nardin & Anderson, October 8, 1896.

27. HARP, microfilm reel 42, Samuel A. Kephart to Hains, December 13, 1896; HARP, microfilm reel 42, Nardin & Anderson to Hains, December 18, 1896; HARP, microfilm reel 56, Hains to Craighill, December 19, 1896; HARP, microfilm reel 56, Hains to Nardin & Anderson, December 24, 1896.

Fill on East of Reservation Wharf 8192 cu yds @ 45	$ 3,686.40
To be paid for to complete Sea Wall 129.2 lin ft coping @ 1.50 = $193.80	
Total amt Spent to Dec. 31st, 1896	
Sea Wall & Embk.	$13,101.16
Fill East of wharf (RR)	3,686.40
	$16,787.56
Cost of inspection	384.75
Total Cost Spent	17,172.31
To complete Coping for fill	20,000.00[28]

A handwritten note in HARP contained the following information about the seawall:

Masonry Complete
Ht. of wall 5.3 above M.L.W.
4 ft wide at base, 3 ft at top, 5 ft coping

There are 659.7 linear ft of wall complete.[29] (See appendix B for sample daily operations reports for this work.)

The contractors' problems continued on into the new year. In March 1897 Nardin and Anderson asked for another extension, of two weeks, because the weather had not allowed any work to be done since January 1. Two days of clear weather were needed after a rainy day before carts could be used on refilled ground. The extension was granted and the contract was completed by April 23, 1897. The construction of the seawall, the filling in of the low grounds in back of

---

28. HARP, microfilm reel 42, "Money Statement to Dec. 31st 1896 for Operations at Fort McHenry, Md."

29. HARP, microfilm reel 42, handwritten note, [December 1896]. Many rough notes and reports, all handwritten by John Keaney, for the 1896 work can be found at the end of reel 42.

it, the grading and seeding of the grounds and planting of trees considerably improved the appearance of the fort's grounds.[30]

The history of Fort McHenry's seawall construction can be viewed in cycles. In each of the three construction phases, the recognized need for seawall protection occurred often years before money was appropriated and the seawall built. Even though construction was not always revealed in any detail in the historic literature, the Army engineers did mention that bad weather and high tides often led to delays of weeks. The seawall construction was repeatedly threatened by the same forces which washed and undermined Point Whetstone. Work progressed only under ideal conditions of low tides and calm skies. Eighty-one years elapsed between the initial building of a section of seawall in 1816 on the southeastern face of the military reservation and the final enclosure of the site in 1897 by the rebuilt seawall extension on the northwestern face. What followed were years of damage by storms, and repairs by both the War Department and the National Park Service.

---

30. HARP, microfilm reel 42, Nardin and Anderson to Hains, March 23, 1897; HARP, microfilm reel 42, Hains to Brig. Gen. John M. Wilson, March 23, 1897; HARP, HD 55, C2, S1897-98, Vol. 3 [?], "Annual report of the Chief of Engineers, United States Army," September 30, 1897.

E. Twentieth Century Damage and Repair

1. Changes Under the War Department

Records in HARP for the next 35 years are very scarce. As a result, little mention was found of needed seawall repairs. It is possible that storm damage and subsequent repairs either went unrecorded or that reports on the subject were not collected during the HARP research. The few references which do refer to seawall repair do little more than mention the fact--no details as to materials or cost are given until the 1930s.

Fort McHenry's commanding officer, Major M. Crawford, reported in August 1904 that "the earth behind the seawall at this post is caving in in several places, notably along the suoth [south] eastern face, due to the action of the waves through the bottom of the wall."[1] He requested repairs be made soon. No futher information concerning this damage was found. A 1907 report detailing the estimated value of all permanent improvements built by the Engineer Department near Baltimore revealed that seawall improvements at Fort McHenry cost $45,000.[2]

In the following years Fort McHenry's status changed several times. (See illustration 14 for conditions in 1912 and illustrations 15 and 16 for period photographs.) The secretary of war gave the city of Baltimore permission in 1914 to occupy the fort for public park purposes. This permit was revoked when World War I was declared, and in 1917 work began on General Hospital #2 at the site. The hospital was built around the original fort and batteries without any damage to the historical features. A 1919 map of the general hospital indicates that seawall repair was needed. No documentation of this work was found. (See illustrations 17 and 18 for 1919 map.) The War Department turned

---

1. HARP, microfilm reel 42, M. Crawford to Lieut. Col. R.L. Hoxie, August 3, 1904.

2. HARP, microfilm reel 42, Hoxie to Brig. Gen. A. Mackenzie, January 14, 1907.

the hospital over to the Public Health Department in 1920, but it was transferred again in 1921, this time to the Veterans Bureau. In 1925 the latter agency released all its rights and interests in the hospital back to the War Department.

On March 3, 1925, Congress approved War Department plans to restore Fort McHenry to its condition at the time of its bombardment by the British in 1814. Only the original fort was to be maintained as a memorial[3]--subsequently the 1873 partly completed water battery and World War I hospital were razed.

In a c. 1925 estimate of restoration costs for the fort only one reference to the seawall's condition was found. No estimate of costs to repair the seawall was developed along with those for the roads, entrance, star fort, upper water battery and other features. This was because "the seawall is in good condition and requires few repairs."[4] (See illustration 19 for photograph of 1925 conditions.) Another estimate for restoration work at the fort, written in 1927, makes no mention of any funds being required for repairing the seawall.[5]

A much different picture emerges, however, from a report written just three years later. In a September 13, 1930, estimate covering proposed improvements to Fort McHenry's grounds no funds were requested to repair the seawall. However, in an attached description of work already completed by this date the seawall was mentioned:

> The seawall was in very bad state of repairs, and has fallen in many places, requiring rebuilding for several hundred feet.

---

3. HARP, NA, RG-94, AGO, Corres, FM, 1927-39, "Fort McHenry, Maryland," compiled by L.W. Leisenring, O.Q.M.G., March 12, 1929.

4. "Estimated Cost of Restoration of Fort McHenry" [c. 1925], pamphlet. Fort McHenry Vertical File, Maryland Collection, Enoch Pratt Free Library, Baltimore, Maryland.

5. HARP, NA, RG-94, AGO, Corres, FM, 1927-39, B.F. Cheatham to the Budget Officer for the War Department, February 11, 1927.

> Difficulty was encountered in doing this work, as work could only be carried on when the tide would permit. This work was accomplished off of rafts and boats. The stones were large, and had to be placed with a derrick.[6]

No other information concerning these repairs was found.

2. National Park Service Ownership

The War Department transferred Fort McHenry to the Department of the Interior, National Park Service on August 10, 1933. During the Depression-era work was done at the fort under the aegis of the Civil Works Administration and the Public Works Administration (PWA). In an annual report for 1934 Gettysburg Superintendent James R. McConaghie noted the damaged seawall had been repaired at a cost of $12,000 in PWA funds. McConaghie added, "Recent storm damage created the need for additional work along the sea wall."[7] (See illustrations 20 and 21 for details of 1933 work.)

Repairs occurred again in 1937. Beginning August 27 the National Park Service, probably using Works Progress Administration (WPA) labor, removed 70 feet of seawall which was damaged in a storm the preceding spring. By September 3 a portion of the seawall had been removed and relaying work was to begin within a week. Almost a month later, on October 1, the superintendent reported very little progress had been made in the seawall repairs because "we were not able to draw plans for final approval until a portion of the wall had been removed to learn the kind of foundation." Approval was not received until "the latter part of the month," needed materials were ordered and received, and the superintendent did not expect the work to be interrupted again.[8]

---

6. HARP, Memorandum to the Adjutant General, Washington, D.C., September 13, 1930.

7. HARP, "Annual report for the Fort McHenry National Park, Year Ending Sept. 30, 1934," James R. McConaghie.

8. HARP, "Superintendent's Narrative Monthly Report, August, 1937," September 3, 1937; HARP, "Superintendent's Narrative Monthly Report, September 1937," October 1, 1937.

By the end of October the repairs were 90 percent complete because "exceedingly favorable weather conditions" allowed the work to progress to the point where only the coping stone was needed. In November, however, "due to the great expense involved," the decision was made not to use coping stone. The top of the seawall was finished with concrete instead. At the end of the month one-half of the concrete sections were poured and the job was 95 percent complete. Cold weather threatened to delay the project in December, but moderate temperatures prevailed long enough to get the concrete poured and the work finished. The total cost was $2,247.[9] (See illustration 22 for 1937 seawall repairs.)

Repointing the seawall began in spring 1938. Evidently the work had been started at some point in time as an Emergency Relief Appropriation project, but was now being done with WPA funds. During May, 9,500 square feet were repointed. The work was finished by the end of June, and the entire seawall, approximately 12,500 square feet, was treated.[10] (See illustration 23 for a photograph of 1938 pointing work. Illustrations 24, 25, 26 detail other pre-1948 damages.)

Photographs in the park files reveal damage incurred in August 1955 by hurricane "Connie." No further data about this damage surfaced. (See illustrations 27 and 28.)

No further mention of the seawall was found until the year 1973. Even though the HARP project extended only until 1958, Fort McHenry staff has kept records for every year to 1984. These National Park Service records are not complete, but do yield some data on the seawall's state of repair.

---

9. HARP, "Superintendent's Narrative Monthly Report for October 1937," November 4, 1937; HARP, "Superintendent's Narrative Monthly Report for November 1937," December 7, 1937; HARP, "Superintendent's Narrative Monthly Report for December 1937," January 7, 1938.

10. HARP, "Superintendent's Narrative Monthly Report for Month of May 1938," June 10, 1938; HARP, "Superintendent's Narrative Monthly Report for June 1938," July 6, 1938.

The seawall's rehabilitation was considered in 1973. Van Reuth and Weidner, Inc., was contracted to study the seawall damage and make recommendations. Even though this study was not fully implemented, the National Park Service was aware, at that point, of the problems with the seawall.

Rehabilitation of the seawall occurred in 1975. The National Park Service contracted the work to Martin G. Inbach, Inc., for $167,687.50. March 3, 1975, was the first day of the contract and the work consisted of placing stone riprap in front of the seawall, repointing, resetting of displaced seawall stones, replacing missing seawall stone and capstone, and reconstructing the seawall at several locations including extending several pipes through the new stone riprap. (See illustration 29 for details of riprap work.) Topsoil was also replaced. The contractor finished the work on June 3, 1975, at a final price of $174,632.12 because of project overruns.[11]

The cost and amounts of materials used on the project were as follows:

Item No.	Contract Quantity	Description	Quantity to Date	Unit Price	Amount to Date
1.	8LF	6-inch Cast iron Pipe	8 LF	10.00	80.00
2.	10LF	6-inch Extra Stength Clay	18 LF	10.00	180.00
3.	14,850 ft	Plastic Filter cloth & steel Anchor Pin	14,400	.30	4,320.00
4.	2,580 Tons	Rip Rap Stone	2,902.55	27.50	79,820.12
5.	13,355 Yd	Topsoil, Seeding, Fertilizing and Mulching	6,000 Yd	.30	1,800.00
6.	Lump Sum	Portland Cement Concrete for Pipe Bedding & Encasement	L.S.	1,500.00	1,500.00

11. "Rehabilitation of Existing Seawall Fort McHenry National Monument and Historic Shrine." Rehabilitate Seawall 106 File, Cul. Resource Mgt. Div., Mid Atlantic Regional Office, National Park Service, Philadelphia, Pennsylvania. A copy of the Van Reuth and Weidner, Inc. report of July 1973 has not been found. A reference to it is cited in the "Rehabilitation" document. Fort McHenry Files (FOMC), Memorandum to Contracting Officer, DSC-CA from District Project Supervisor Robert M. Dinterman, August 5, 1975.

7.	5,350 Ft	Reconstruction of Stone Walls	5,218 Ft	9.00	46,962.00
8.	9,550 Ft	Repointed Masonry	9,800 Ft	3.20	31,360.00
9.	46 Ft.	Resetting Displaced or Loose Wall Stone & Cap Stone	90 Ft	21.00	1,890.00
10.	296 Ft.	Replace Missing Wall stone and Missing or Broken Cap Stone	311 Ft	20.00	6,220.00
11.	$1,000.00	Force Account Work[12]			

Tropical storm "David" inflicted major damage on the seawall in September 1979. According to staff meeting records, "The seawall is practically gone now, and the only real way of repairing it is to tear down what is left, and rebuild the entire damaged seawall."[13] The storm washed out approximately 75 feet of seawall and lifted around 150 feet of coping stones from sections of the seawall. Photographs were taken of the damage and temporary work was done to prevent further deterioration from subsequent storms. In 1981 portions of the seawall breached by the 1979 storm were stabilized with sandbags.[14] The breaches were finally repaired in 1984.

Because the records for the twentieth century are so scarce it is difficult to determine how often repairs were required, how extensive any damage was, or exactly where the seawall suffered damage. It is probable that the cycle of damage and repair occurred as frequently in the post-1900 years as it had since the first section of seawall was built.

It is known that a change in philosophy of the wall's design occurred between the nineteenth and twentieth centuries. The

---

12. Ibid.

13. FOMC, "Squad Meeting Minutes," September 13, 1979.

14. FOMC, "Squad Meeting Minutes," October 10, 1979; November 9, 1979, FOMC, "Resource Management Plan," National Park Service, United States Department of the Interior, 1981, pp. 7, 10.

original seawall (1816-1897) construction was a dry laid wall topped with a capstone. Repairs were in kind. The first evidence of design change is in 1919 and later when the seawall was repaired with cement. In 1938 pointing work occurred, which changed the seawall's original configuration. Perhaps this change in design philosophy happened in an attempt to build a more water resistant wall. The desire to make the seawall impervious to the wave action may have had an effect on drainage of the fill behind the seawall.

The seawall has performed several functions. Foremost, it prevented major erosion of Fort McHenry's grounds. Serious flooding occurred only when sections of the seawall itself were destroyed in storms. Secondly, the seawall protected the grounds, and in essence, Fort McHenry's garrison, from unhealthy conditions generated by pollution in Patapsco Bay. The seawall prevented decayed matter and other debris from washing onto and possibly contaminating the grounds. There is also evidence that privies placed on the seawall provided a type of sewage system for some length of time. Wave action and high tides kept the privies reasonably clean. Thirdly, the seawall probably served a function in the social life of both the garrison and nearby neighbors. The one reference to women using the seawall as a promenade is, unfortunately, the only glimpse into the social use of the seawall. It probably served as a meeting place, an observation deck for bay activities, or the perfect promenade for an evening walk.

Even though the seawall did not exist when Fort McHenry withstood the British bombardment in 1814, its subsequent protection helped insure the fort's existence in the face of winds and waves. Fort McHenry's seawall continues to stand on guard, like a dutiful but overlooked soldier, ever in defense against the enemy.

CHRONOLOGY

April 13, 1794 -- In a letter, Rivardi mentions the ground being undermined by the water.

May 14, 1814 -- first mention of need for stone wall to secure the lower or water battery.

September 6, 1816 -- preparations to build seawall

November 6, 1816 -- estimates of work needed, materials needed to build seawall

November 15, 1816 -- water encroaching upon the point; part of which had been washed away; a seawall would be serviceable

December 4, 1816 -- work had commenced on seawall

December 31, 1817 -- 1,460 ft of seawall completed; 3 feet foundation, 4 feet high, 4-6 feet thickness

January 9, 1818 -- request to "finish the wall. . . to secure the site of Fort McHenry from the Effect of the tide, which had for Years been gradually cutting away the Bank at the Point upon which the Fort stands."

June 25, 1818 -- it is intended to complete the work begun by Colonel Armistead

December 15, 1818 -- seawall sustained no damage in the storm of 4th or 5th; proposal to commence coping in the spring

December 21, 1818 -- proposal to use granite from the Susquehannah for the seawall coping

April 20, 1819 -- a glacias to be made to the edge of the seawall

September 15, 1819 -- the "wall" proposed by Hindman to extend from the point where the wall "now building" was commenced to the wharf, will not be undertaken

September 21, 1819 -- re: Armistead's request for "addition to the Wall"--Smith does not believe it necessary "There is no appearance of the water having encroached upon the land on that side," a bank forming 30 or 60 feet from the shore affords a good protection against the violence of the surf.

June 1, 1829 -- "a sufficient quantity of bricks can be obtained from the old seawall in front of this work, and from old Fort Covington without cost to the Government" to build quarters

June 8, 1830 -- estimate of funds required for completing the seawall; for continuing seawall from its termination to the wharf, a distance of from 750 to 800 feet

June 9, 1830 -- fund request not sufficient to authorize the construction of the seawall about the Fort

May [?] 8, 1830 -- estimate of funds required to complete the seawall

November 10, 1836 -- work started on "that part of the Sea Wall which it was necessary to complete, on the North East part of the Point. . . will be finished by the latter end of January next."

November 15, 1836 -- the estimated expense of building a seawall to the new purchase is $10,000

December 4, 1836 -- the repairs of Fort McHenry reported as completed by the Engineer Department

October 24, 1837 -- report of repairs; "The Sea Wall of Granite from the Susquehannah, has been built to the extent of 1300 ft exclusive of the Coping about 600 ft remains to be finished on the North Side, & about 1000 ft on the South Side of the Peninsula in which the Fort Stands."

December 16, 1837 -- repairs to be completed: "The Stone Wall about 1700 feet remains to be built, & the Coping Stone laid on about 1200 feet."

October 29, 1838 -- commenced operations on August 1st, on the seawall--the whole extent of this wall will be when finished 2,111 feet--on this There were laid this Season 830 feet of Coping Stone & 150 feet of the wall built--950 feet have been completed. 1,550 feet of wall, four feet & an half high, have been built exclusive of the foundations, which varies from eighteen inches to two feet deep.

Thus leaving but 561 feet to be built, of which the foundation has laid this summer except about 50 feet.

October 31, 1838 -- seawall is complete except 600 feet, the foundation of which is laid--& then shall have about 1000 ft of coping to put on which has been delivered.

December 4, 1838 -- Report of the secretary of war: "The seawall is now completed to a length of 950 feet, and 1,550 feet more are 4 1/2 feet high."

October 17, 1839 -- the remaining part of the seawall about 560 feet has been finished

March 2, 1840 -- report that the seawall commenced October 1, 1836, and worked upon at different times until August 1839 was finished; this wall commences at the northeast point of the property and runs to the boundary wall

August 25, 1842 -- a gale did "considerable injury" to the seawall

September 5, 1842 -- re: storm damage; prostrate portions of the wall are to be relaid, any single stones recovered are to be returned to their proper positions

September 11, 1842 -- estimate for repair of seawall--$165

October 11, 1842 -- repairs of the seawall were finished on the 28th of last month

January 7, 1845 -- proposal to build a seawall "for the protection of the Hospital position"

November 28, 1857 -- report that the seawall has never been completed; it extends along the entire north side, round the east corner, and on the South side to a short distance west of the fort, but from this point to the west wall separating the public ground from private property there is nothing to prevent the cutting away of the bank by the action of the waves

February 9, 1858 -- plan to extend seawall to the south

March 16, 1858 -- estimate to build seawall; 1,026 cub yds of dry rubble, masonry @ $6 $6,156

November 5, 1862 -- Brewerton wants to know if appropriation has been made to extend the seawall on the south side

April 28, 1870 -- inspection report: the sea is encroaching on the work, an extra seawall is required to protect it

February 28, 1874 -- "On the southern side the line desired by the U.S. to be established is in prolongation of the existing Port Warden's line. . . [and] the line is proposed to coincide with the seawall now bounding the U.S. land."

May 31, 1875 -- formation of unhealthy beach along seawall by wharf

September 18, 1876 -- storm damaged wharf; the seawall was washed badly in places beyond the post traders

October 1, 1876 -- severe storm of [September] 17th-18th shook up badly the south face of the sea wall about the site

October 4, 1876 -- appropriation of $1,000 allotted to repair storm damage at Forts McHenry, Carroll, Washington, & Foote

November 1, 1876 -- repairs to seawall damaged by storm have been commenced

December 1, 1876 -- repairs to seawall have been continued through the month

July 1877 -- repairs as extensive as funds would allow were made upon the wall during October and November 1876

March 4, 1878 -- proposal to extend reservation with fill and construction of new outer seawall

March 31, 1879 -- the seawall has come to be in such a state as to need very extensive repairs which should not be longer deferred, $2,700 will be required

April 22, 1879 -- money not exceeding $3,000 could be very advantageously expended on the seawall which is in very bad condition

July 1, 1879 -- reparation of the seawall has been carried out

August 2, 1879 -- the reparation of the seawall; this has been entirely completed with the setting of the new coping, 10 inches thick by 4 feet wide, over the 50 ft of wall near sutler's store, left incomplete June 30, 1879

October 20, 1879 -- Report of The Chief of Engineers, "The repairs of the sea wall should be continued throughout the remainder of its length. The wall has been standing over 40 years. . . . It would be better, however, to build a new sea-wall on the port warden's line fill in the area thus gained, and thus extend the drill ground. The filling could be readily and cheaply made by allowing vessels coming to the port to drop their ballast there."

February 25, 1880 -- dropping off ballast to extend shoreline in front of the seawall

June 1, 1880 -- "The contractors for building the new dry dock have ceased dumping their excavated material on the site between the existing seawall and the prescribed Port warder's line."

July 1, 1880 -- a bulkhead of ballast was made by the U.S. without expense; a seawall should be built along the line of the temporary bulkheads; dumping of ballast continues

July 1880 - May 1881 -- dumping of ballast in front of seawall continues

April 2, 1881 -- repairs to slopes and sea wall will be commenced during the month

June 4, 1881 -- repairs to seawall, coping removed from where area is being filled in and used to replace coping in other places

July 12, 1881 -- repairs behind seawall are "rough appearing"

November 29, 1881 -- no encroachment upon work by the sea

May 23, 1883 -- iron miners in the Patapsco are working too close to the seawall

August 12, 1884 -- request to extend the seawall all the way around

January 29, 1885 -- another request to extend the seawall

May 1885 -- another request to extend the seawall, being "left unfinished at the end in rear of the bakehouse, on the south side of the fort."

January 8, 1886 -- storm damaged seawall, that portion looking toward Fort Carroll

Feburary 2, 1886 -- severe gale did damage to the seawall; report will be made as to extent and remedy of damage

June 10, 1888 -- landslide on the parapet has nearly thrown the seawall into the water; the seawall needs repair in several places

October 2, 1888 -- estimate to repair new water battery seawall $2,750

October 4, 1888 -- proposal to sink wells to protect seawall

October 9, 1888 -- proposal to build new foundation and placement of riprap in front of new wall

November 8, 1888 -- repair of seawall and adjacent parapet estimate $2,975

March 23, 1889 -- widening of the channel results in damage to the seawall, undermining of wall; riprap protection estimate--$300

April 16, 1889 -- contractors repairing seawall ask for extension

June 17, 1889 -- storms on May 31 further damage seawall; proposal to riprap in front of seawall until a weight to balance the pressure at rear is gotten

June 22, 1889 -- new seawall has stopped moving

July 19, 1889 -- repairs to slopes and seawall are underway

July 1889 -- another request to build seawall along the line of the temporary bulkhead

August 20, 1889 -- "dangerous holes" appear in seawall near low water line, which cannot be filled until the low water season in autumn

August 26, 1889 -- examination of the seawall shows that the dry underpinning needs replacement to prevent the falling of considerable portions of the wall

August 29, 1889 -- estimate of $1,986 to repair water battery and seawall

October 16, 1889 -- low bidder for repair of seawall was George F. Nardin

October 28, 1889 -- proposal to remove upper half of seawall, recently built, at end of water battery and rebuild it in a straight line, "merely as a matter of 'looks'"

November 30, 1889 -- small amount of repairs to seawall done by a contractor

January 17, 1890 -- work at Fort McHenry is completed

June 12, 1890 -- proposal to build "wall" at foot of cliff to prevent washing of cemetery

July 1890 -- another request to build seawall along line of temporary bulkhead

October 6, 1892 -- money allotted to replace riprap at foot of seawall at westerly end of exterior water battery

October 11, 1892 -- $25 available to repair riprap

April 12, 1893 -- work not yet started due to inclement weather, but will be before end of June

August 30, 1893 -- storm on August 28 destroyed wharf, damaged earthworks, and carried away extensive portions of the seawall

September 7, 1893 -- the gale of August 28 "considerably injured" the seawall; estimate of cost $2,500

October 20, 1893 -- a storm on October 13 further damaged seawall; several sections measuring from 20-30 ft have been opened; wall openings made in August storm now measure 75 ft in length; tide rose 3 ft above sea wall

November 1, 1893 -- allotment of $2,000 made to repair seawall

November 8, 1893 -- heavy masonry will be needed for repairs of the seawall

November 19, 1893 -- proposal to extend seawall on the north west side; considerable ground had been washed away and wall is needed on south side to keep water from undermining the post cemetery which was badly exposed by October 13 storm

December 6, 1893 -- to extend the seawall from its present terminus on the western face of reservation, to the north boundary wall, and to grade and fill ground in rear to protect cemetery will require 2300 c. yds dry stone, 9,000 ft 6" coping, 5,000 c. yds earth and shell filling

December 7, 1893 -- serious injury was done to the seawall by the gales of August and October; repairs have been in progress with allotment of $2,000 but have been suspended for the winter

May 3, 1894 -- notice inviting proposals for materials for repair of seawall

May 15, 1894 -- George F. Nardin's proposal to furnish sand, coping, stone is accepted

May 16, 1894 -- Maryland Lime & Cement Company proposal to furnish cement is accepted

June 30, 1894 -- serious injury to seawall from gales of August and October 1893; repairs have been in progress, but are suspended for want of funds

August 8, 1894 -- the seawall from wharf to new section does not require further repair at present

August 13, 1894 -- estimate for building seawall to protect cemetery

August 16, 1894 -- the existing seawall has been sufficiently repaired for the present. The entire western face of the property from termination of the old seawall to northern boundary is entirely unprotected; to build a seawall along the whole front, 1,043 feet, would cost $12,900.

September 25, 1894 -- appropriation to protect site in front of cemetery

October 25, 1894 -- contract with George F. Nardin for building a seawall

December 24, 1894 -- building seawall on southwest front of reservation: contractor is hauling stone, has foundation in, and 80 ft of wall 3 ft high

January 2, 1895 -- Nardin's contract time extended 20 days

January 4, 1895 -- work has been in progress since November 9 on portion of seawall in rear of cemetery; this seawall should be extended in both directions when money can be had for the purchase

March 24, 1895 -- request that Nardin resume work on seawall on April 1st

March 28, 1895 -- specification for remainder of seawall behind Fort McHenry

April 30, 1895 -- Albert Weber's proposal for building seawall accepted

May 4, 1895 -- contract with Albert Weber

July 31, 1895 -- contract extended from August 5, 1895, to September 30, 1895, because of "extraordinary" high tides

September 10, 1895 -- to put Fort McHenry into a respectable condition, a seawall (similar to one on southwest front) on the north front extending from a point near the wharf to property line of Dry Dock G which will include the present partial filling of shells and earth is needed

September 14, 1895 -- the "filling in" behind new seawall will soon be completed, and surfaces ready for being covered with "street sweepings" or equally good material for growing grass for protection of slopes

September 14, 1895 -- estimate for constructing seawall (similar to that on southwest front) on the north front, extending from a point near the wharf to such point on the line of property of the Dry Dock Company will include the present partial filling of shells and stone

September 20, 1895 -- completion on 19th of work under contract with Albert Weber

September 28, 1895 -- building a portion of the seawall in rear of the cemetery 227 feet long was finished May 22, 1895 (Nardin)

November 14, 1895 -- estimate to build seawall on north front

July 1, 1896 -- allotment of $13,750 to be applied to construction of a seawall and embankment on the water front of the Fort McHenry, Md., reservation

August 8, 1896 -- firm of Nardin and Anderson was lowest bid for the seawall

August 26, 1896 -- contract with Nardin and Anderson for building seawall

October 8, 1896 -- proposal of Nardin's to refill back of old seawall accepted

December 13, 1896 -- contractors broke sewer pipe near where it joined the original one; the original one is broken where they took up the stones from the old wall, which has caused the flooding of that part of the post

December 19, 1896 -- contract of Nardin extended from January 1 to April 1, 1897

March 23, 1897 -- contract of Nardin and Anderson extended from April 1, 1897 to April 30, 1897

September 30, 1897 -- the seawall on the east side of the reservation was completed; this completes a seawall so much needed for protection from the action of the sea; work done by contract which was commenced August 28, 1896, completed April 23, 1897 (Nardin)

August 3, 1904 -- earth behind the seawall is caving in in several places, notably along the southeastern face, due to the action of the waves through the bottom of the wall

January 14, 1907 -- value of all permanent improvements to the seawall $45,000

September 30, 1934 -- Public Works Administration: repair of damaged seawall; allotment $12,000, 100 percent completed

September 3, 1937 -- removal of 70 ft of seawall damaged in storm last spring

November 4, 1937 -- seawall laid to a point, now ready for coping stone job 90 percent complete

December 7, 1937 -- coping stone not used on top of seawall, being finished with concrete

January 7, 1938 -- job is finished; final construction consisted of pouring the concrete cup

June 10, 1938 -- Works Progress Administration: 9,500 sq. ft. of seawall repointed

July 6, 1938 -- repointing completed for 12,500 sq ft

July 1973 -- Van Reuth and Weidner, Inc., prepare report on the rehabilitation of the seawall

November 14, 1974 -- bidding documents: rehabilitation of seawall by National Park Service

August 5, 1975 -- contract requirements completed for seawall rehabilitation; started March 3, 1975, completed May 29, 1975; riprap placed along seawall

September 13, 1979 -- seawall sustained major damage from hurricane "David"; seawall practically gone and only way to repair is to take down what is left and rebuild the entire damaged seawall

RECOMMENDATIONS FOR FURTHER RESEARCH

The HARP historians labored under time restraints but they gathered a voluminous amount of material concerning Fort McHenry. Gaps in the data do exist, however, and further labor intensive research on the seawall could be conducted at the National Archives in the War Department records for these missing years which may or may not result in additional construction related data.

The Fort McHenry files covering the National Park Service years are also not complete. Research in the National Park Service records in the National Archives could possibly reveal further data on twentieth century seawall damage and repair.

Further research in the HARP files on any topic would be greatly aided if the bound materials were indexed. All of the HARP microfilm reels should be duplicated, indexed, and added to the bound materials.

Archeological investigations behind the seawall could possibly answer construction questions and identify the type and quantity of fill placed behind the seawall. The fill may be related to the fort's hydrological drainage problems.

ILLUSTRATIONS

Illustration 1. Plan of Fort McHenry 1803

Drawer 51.
Sheet 1

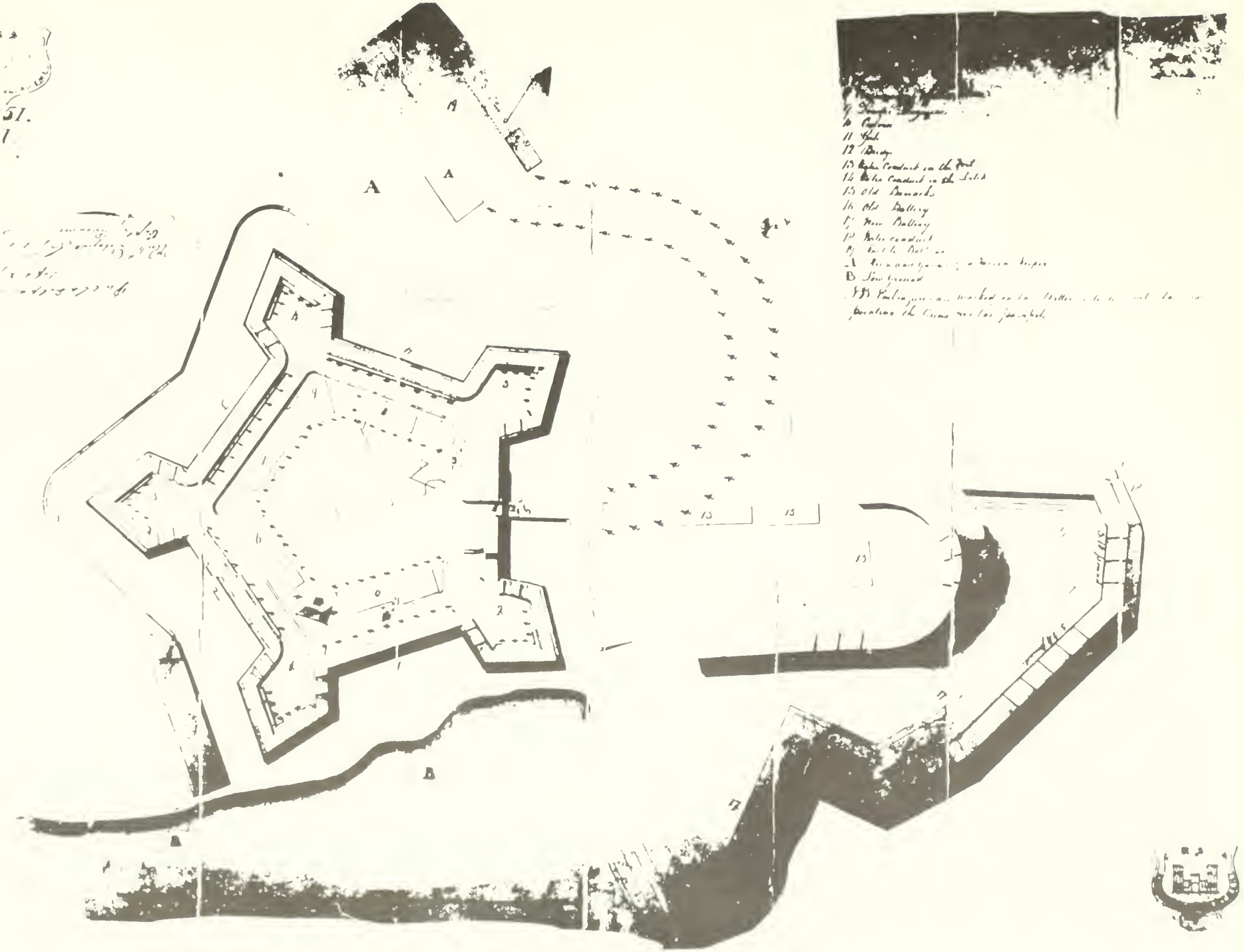
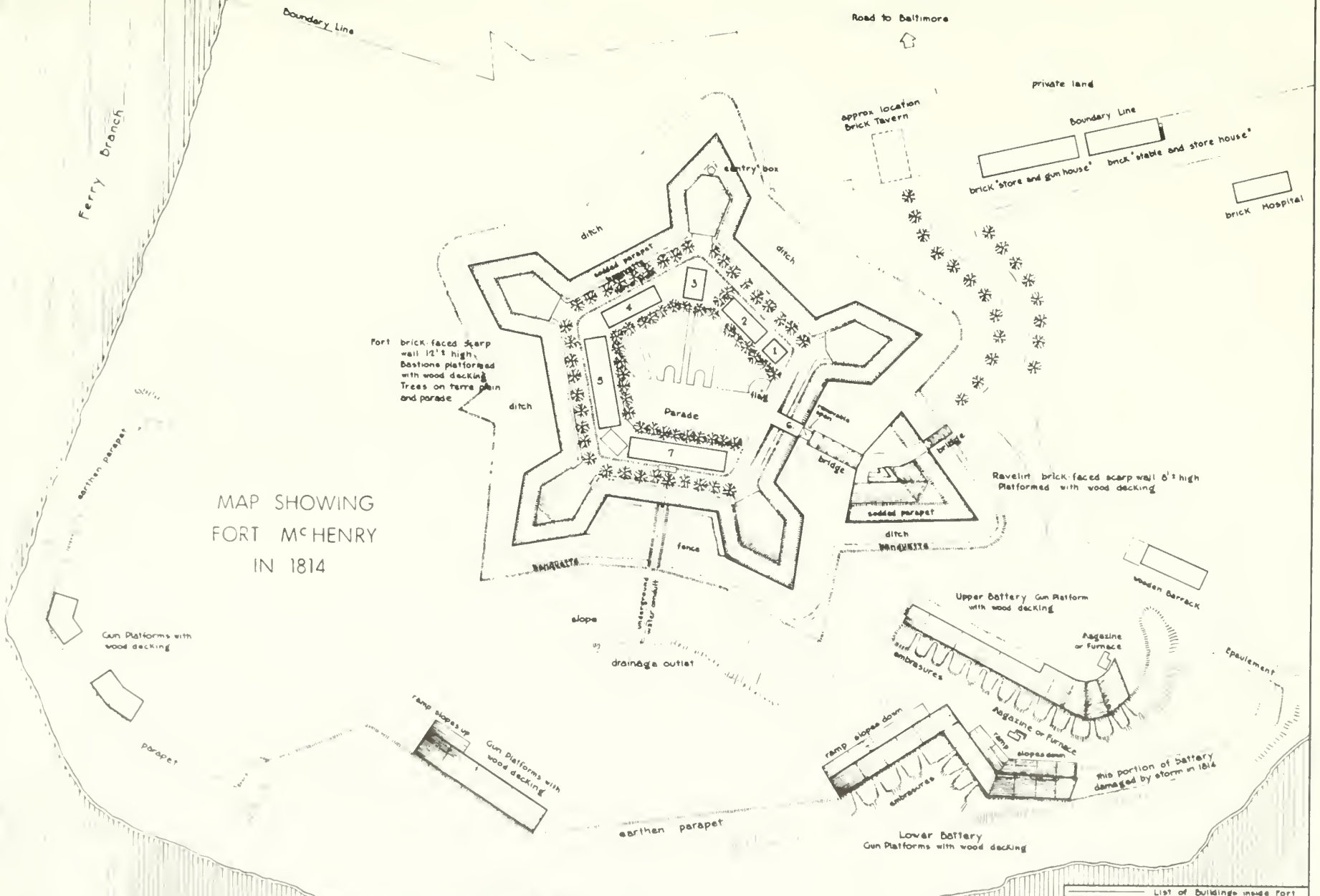


Illustration 2. HABS map of Fort McHenry 1814



List of Buildings inside Fort

1. Guard House
2. Commanding Officer's Quarters and Office
3. Powder Magazine
4. Officers' Quarters
5. No 1 Soldiers' Barracks
6. Sally Port
7. No 2 Soldiers' Barracks

BASIC DATA:
1953 Plan National Archives Records of the War Dept Cartographic Section Record Group 77 drawer 91 sheet 1
1814 Plan National Archives Records of the War Dept Cartographic Section Record Group 77 drawer 91 sheet 2
Bradford A Sydney and others Fort McHenry Historical and Archaeological Research Project 1961 1958 Nat Park Service, 1958
Nelson, Lee H. An Architectural Study of Fort McHenry Nat Park Service Historic American Buildings Survey. 1961
MacKenzie D.C. "Narrative to Accompany Historical Base Map"
Existing conditions

A GIFT OF LEE H NELSON
UNDER DIRECTION OF THE UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE BRANCH OF PLANS AND DESIGN

NAME OF STRUCTURE
FORT McHENRY
FORT McHENRY NATIONAL MONUMENT AND HISTORIC SHRINE · BALTIMORE COUNTY · BALTIMORE · MARYLAND

SURVEY NO MD. 63

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 1 OF 11 SHEETS

Illustration 3. William Tell Poussin Plan and Profile of Fort McHenry 1819

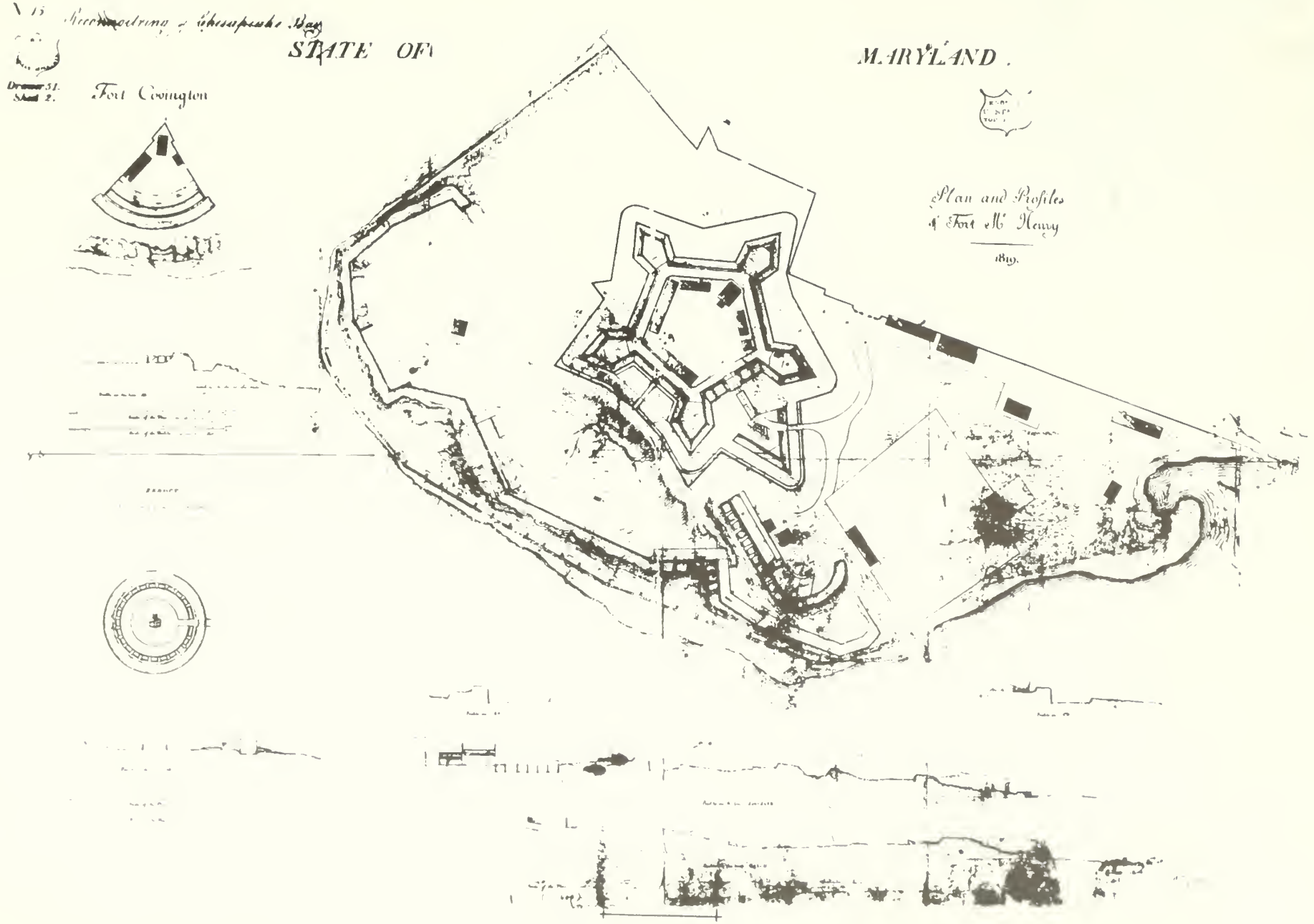
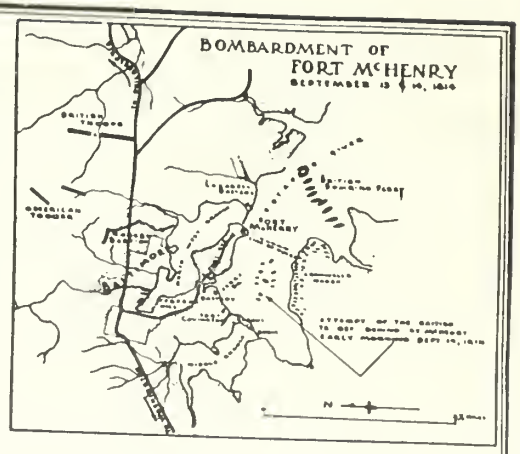
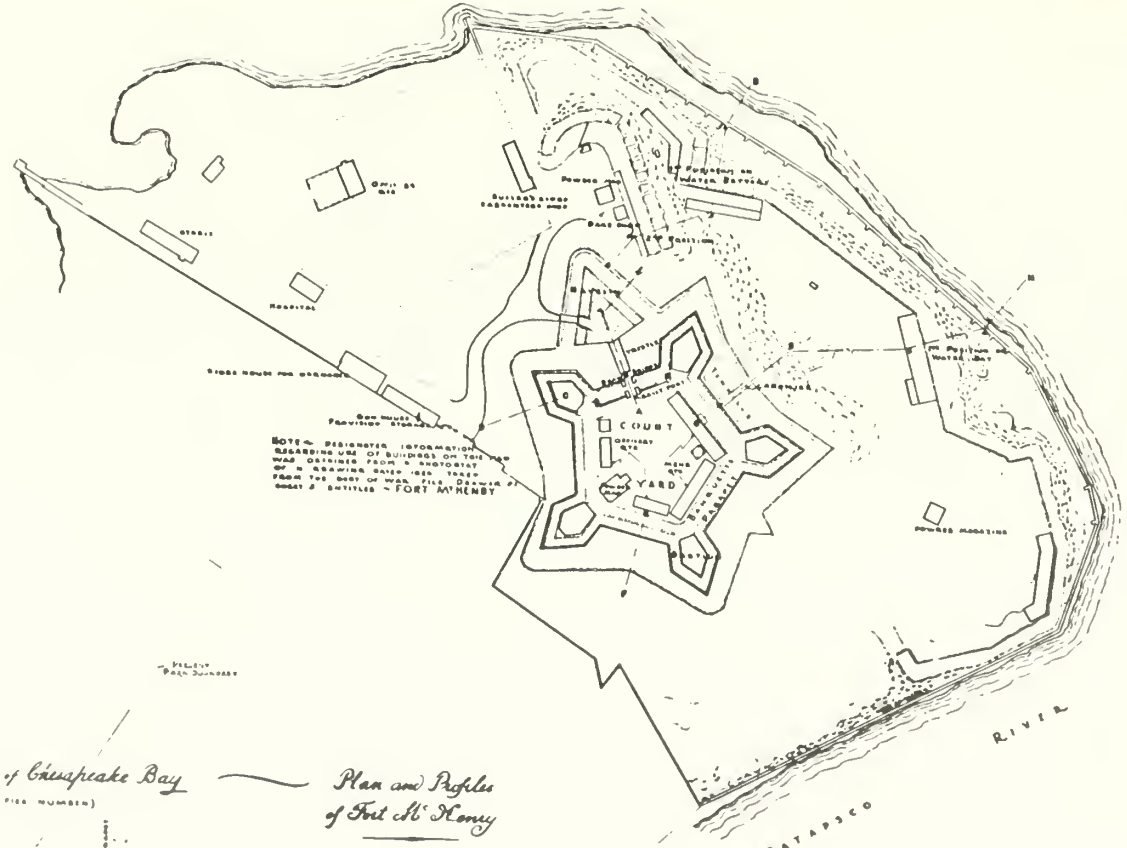
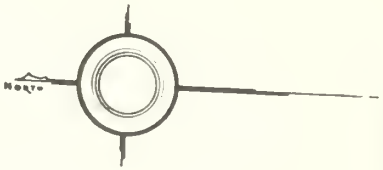

STATE OF
MARYLAND.
Fort Covington
Plan and Profiles
of Fort Mc Henry
1819.

Illustration 4. Historical Base Map of Fort McHenry 1819 (1942)



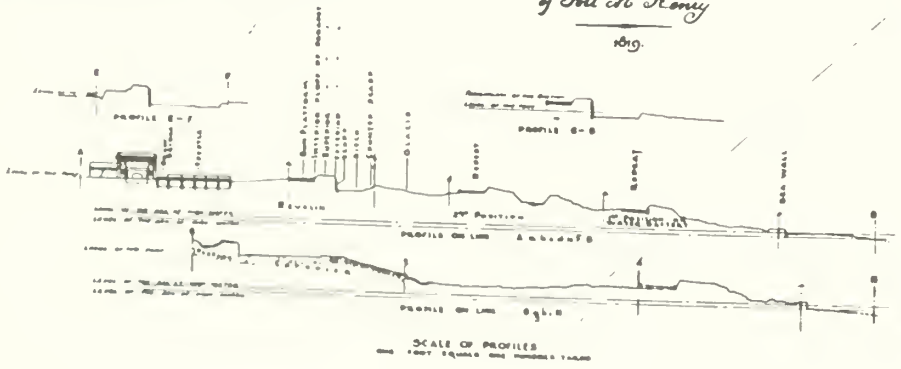




No 15 Reconnoitring of Chesapeake Bay — Plan and Profiles of Fort M^c Henry

Drawer 51
Sheet- 8 (WAR DEPT FILE NUMBER)

1819.



UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

HISTORICAL BASE MAP

PART OF THE MASTER PLAN

FORT McHENRY
NATIONAL MONUMENT & HISTORIC SHRINE

HALF-SIZE REPRODUCTION SCALE 1"=100'

DRAWN BY THE BRANCH OF PLANS AND DESIGN
FROM NATIONAL PARK SERVICE DATA AS OF JAN 1, 1962

Drawn by W.L.W. Checked by ROS

DRAWING NUMBER
NHFH-NPM
1037

(1)

BASE DATA - HISTORICAL BASE MAP OF THE 1939 MASTER PLAN - 1939 DATA TRACED FROM ORIGINAL PLANS IN FILES OF US DEPARTMENT OF WAR - OFFICE OF US ARMY ENGINEERS. TRACED TRACINGS WERE REDUCED BY HALF

Illustration 5. Fort McHenry 1834

Illustration 6. Fort McHenry 1836

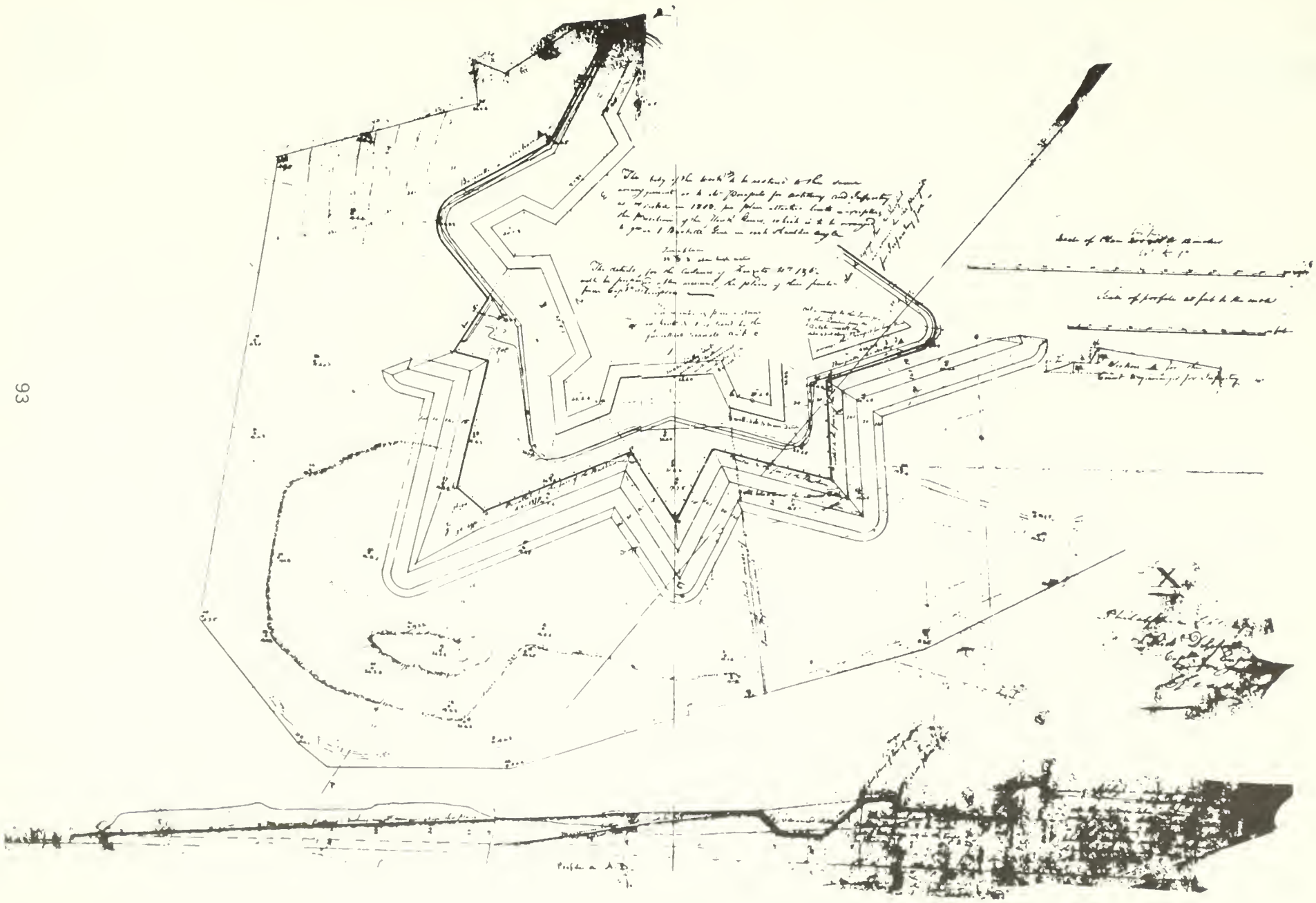


Illustration 7. Plan of Exterior Barbette Battery of Fort McHenry 1870

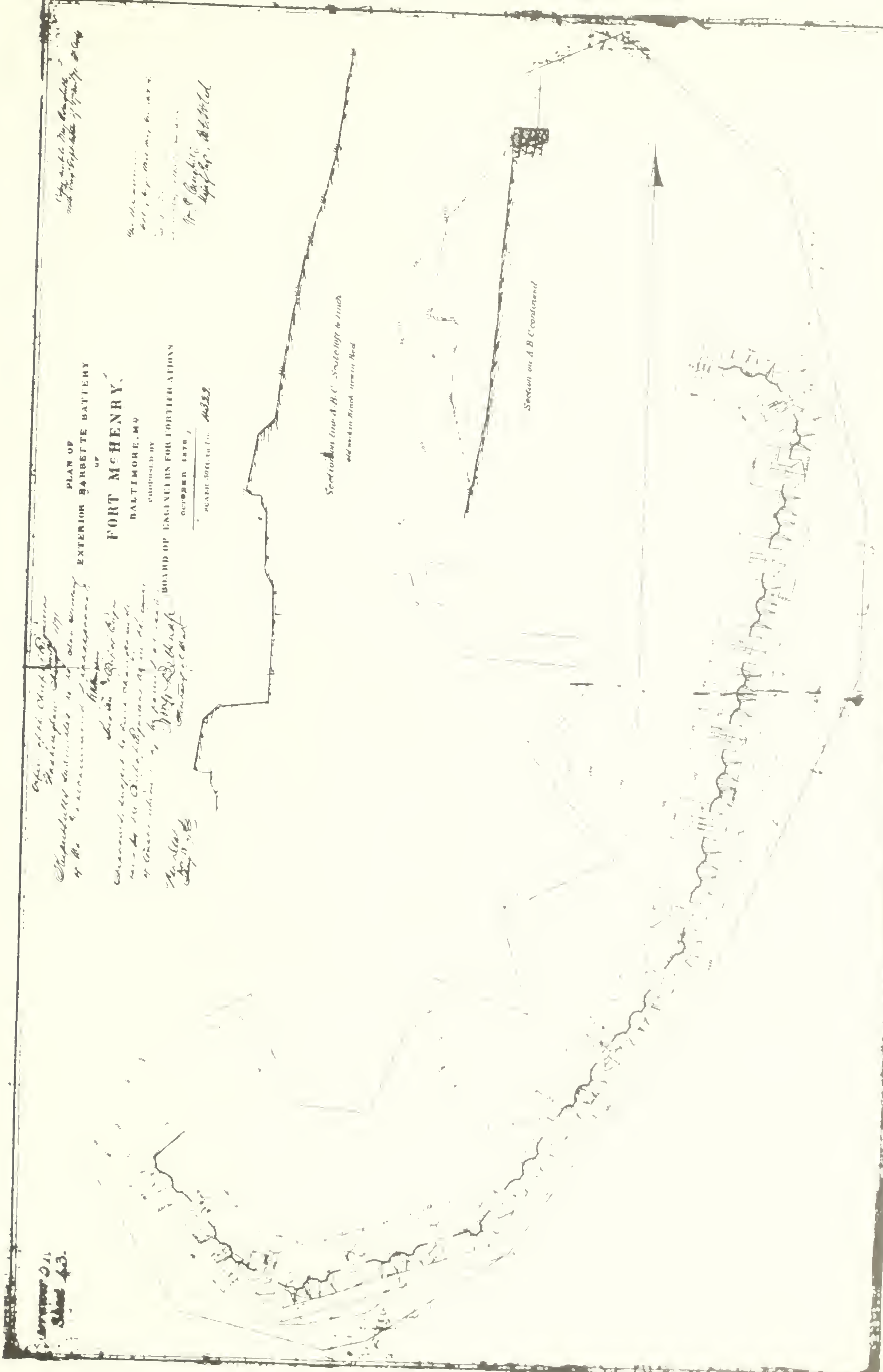
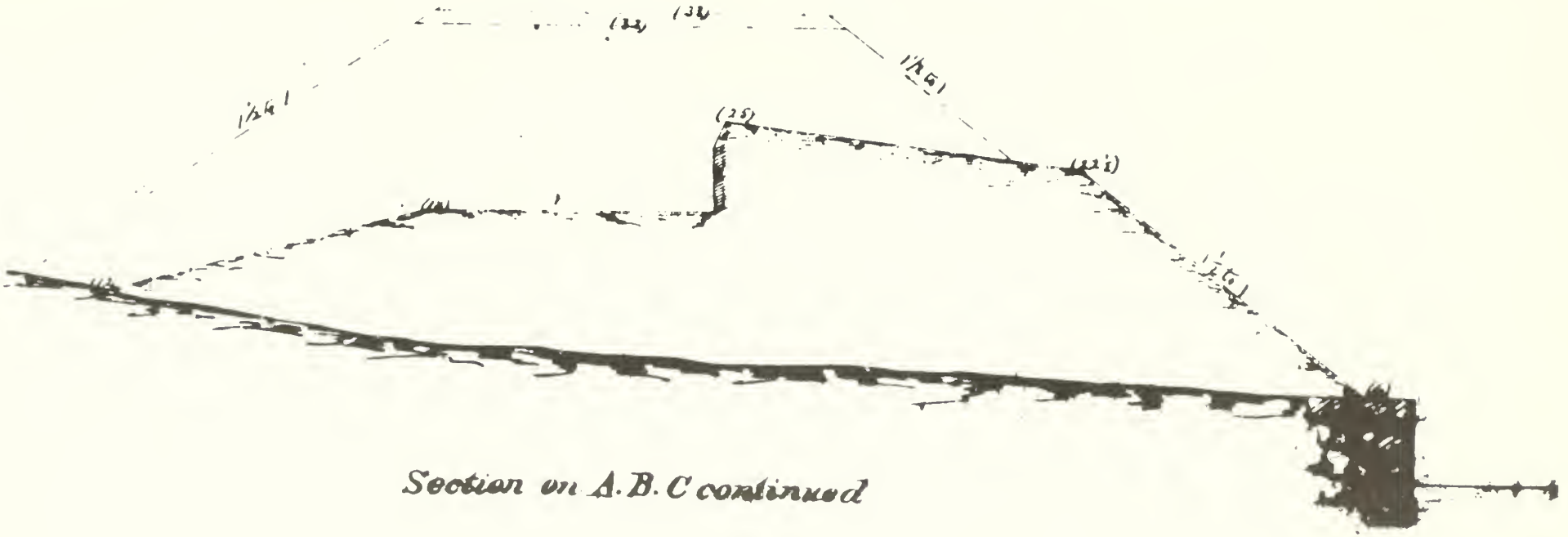

Drawer 51
Sheet 43.
PLAN OF
EXTERIOR BARBETTE BATTERY
OF
FORT McHENRY,
BALTIMORE, MD.
PROPOSED BY
BOARD OF ENGINEERS FOR FORTIFICATIONS
OCTOBER 1870,
SCALE 30ft. to 1 in.
Section on line A.B.C. Scale 10ft to 1 inch
old work in Black new in Red
Section on A B C continued

Illustration 8. 1870 Exterior Barbette Battery, Detail



Section on A.B.C continued

Illustration 9. 1878 map of proposed boundary change

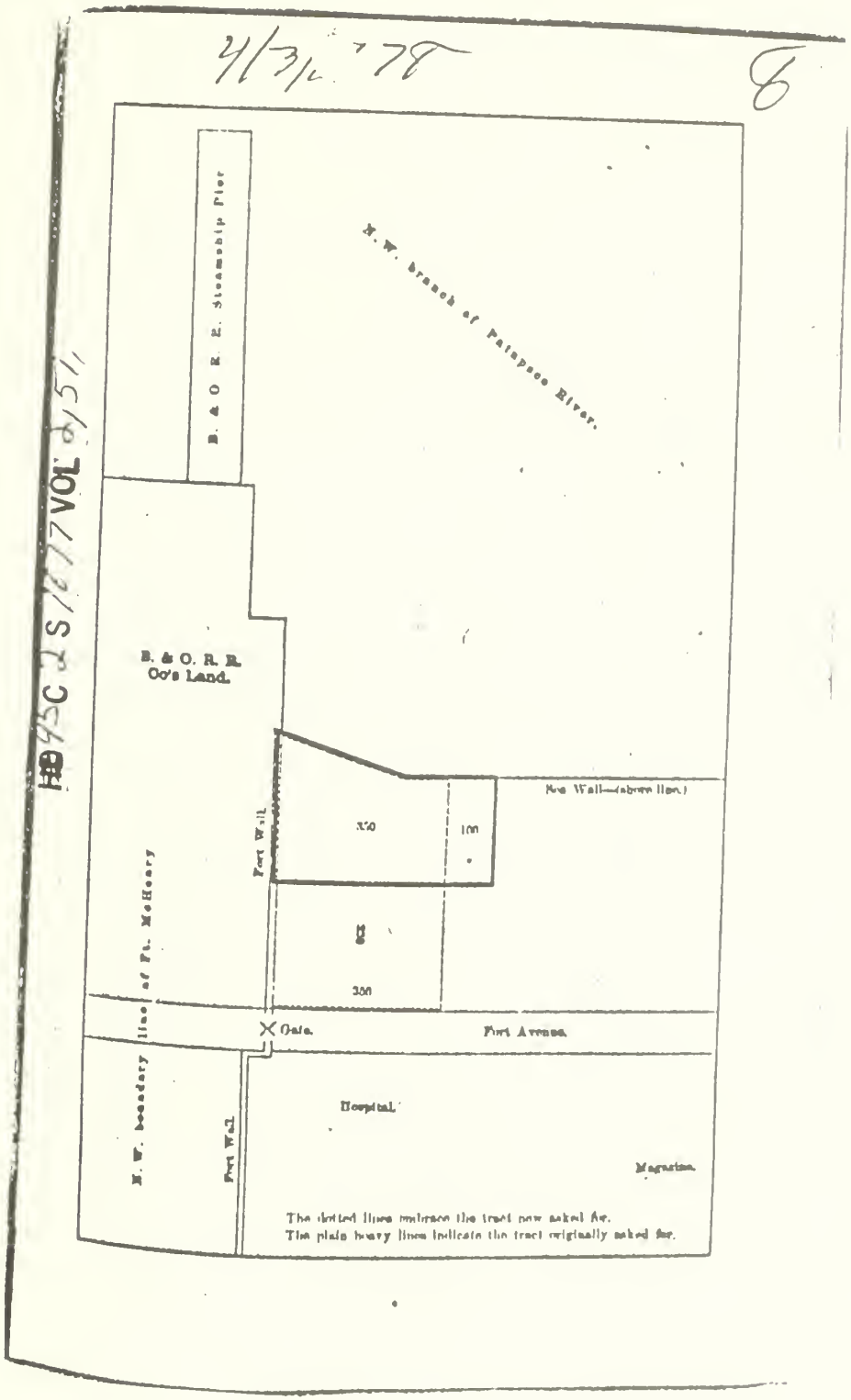

4/3/4 '78
8
B. & O. R. R. Steamship Pier
N. W. branch of Patapsco River.
B. & O. R. R. Co's Land.
Fort Wall
Sea Wall (above line)
100
350
N. W. boundary line of Ft. McHenry
Gate.
Fort Avenue
Hospital
Magazine
The dotted lines embrace the tract now asked for.
The plain heavy lines indicate the tract originally asked for.

Illustration 10. 1870 map showing encroachment of high waterline and location of proposed seawall

Drawer 51.
Sheet 42.

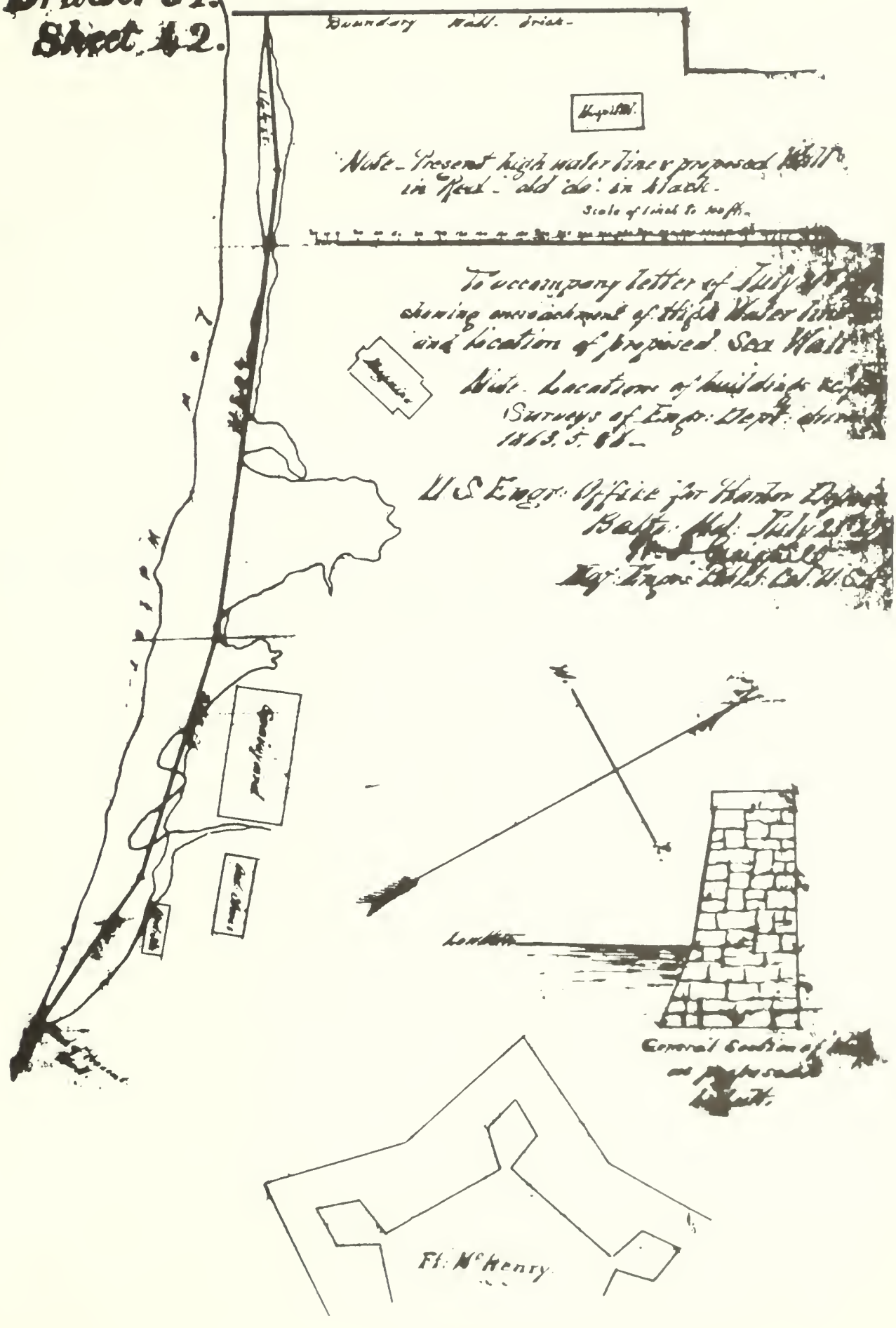
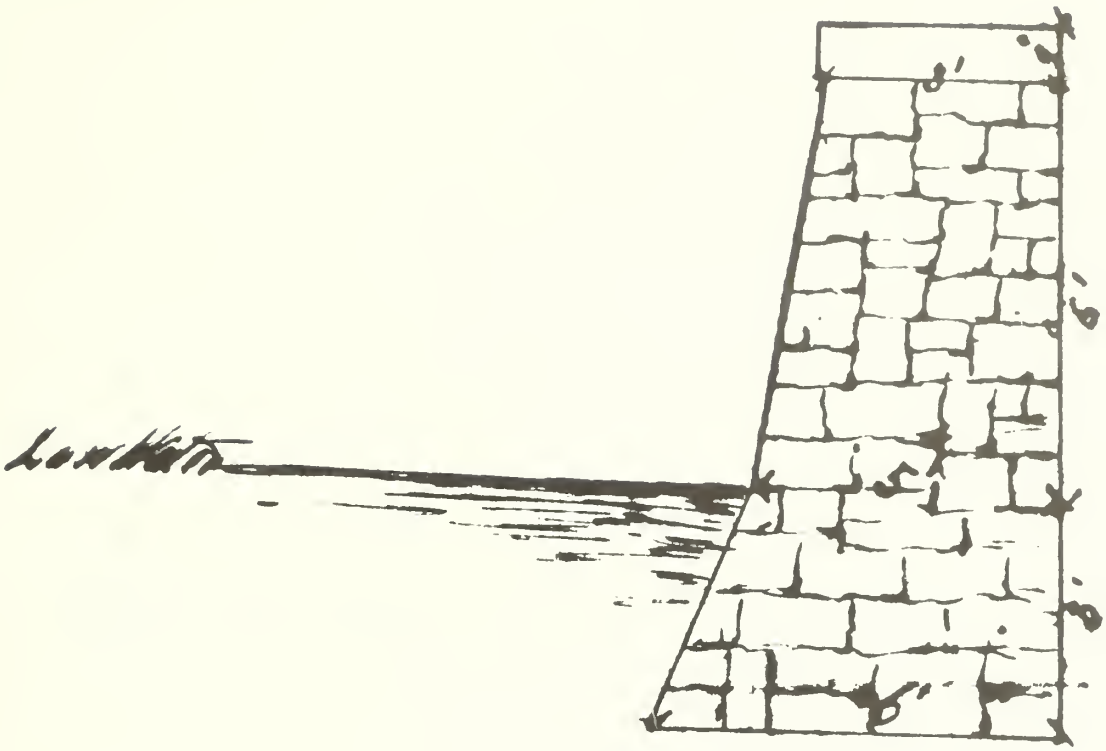


Illustration 11. 1870 seawall proposal, Detail



General Section of Walk
as proposed to
be built.

Illustration 12. Plan of Fort McHenry 1888

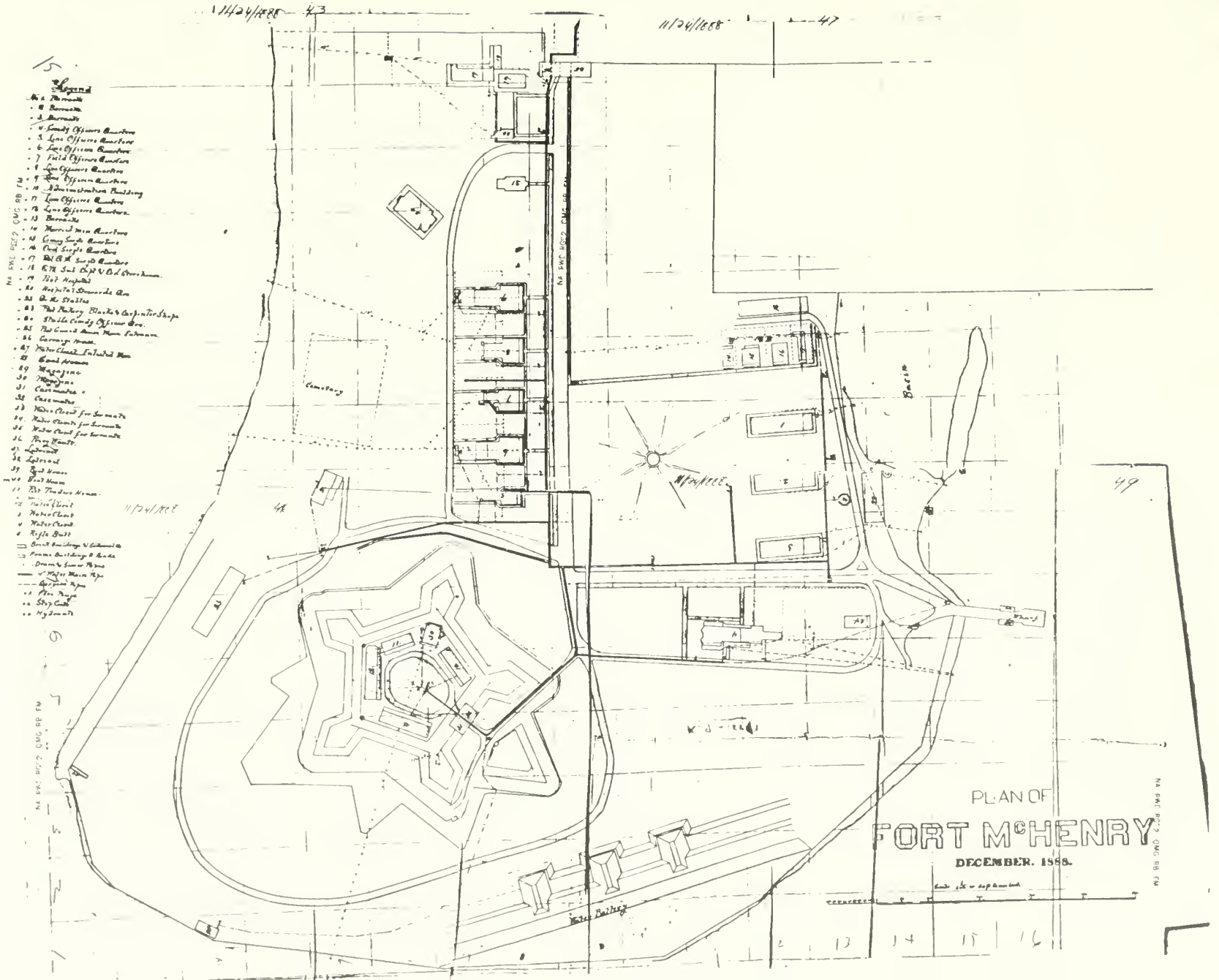
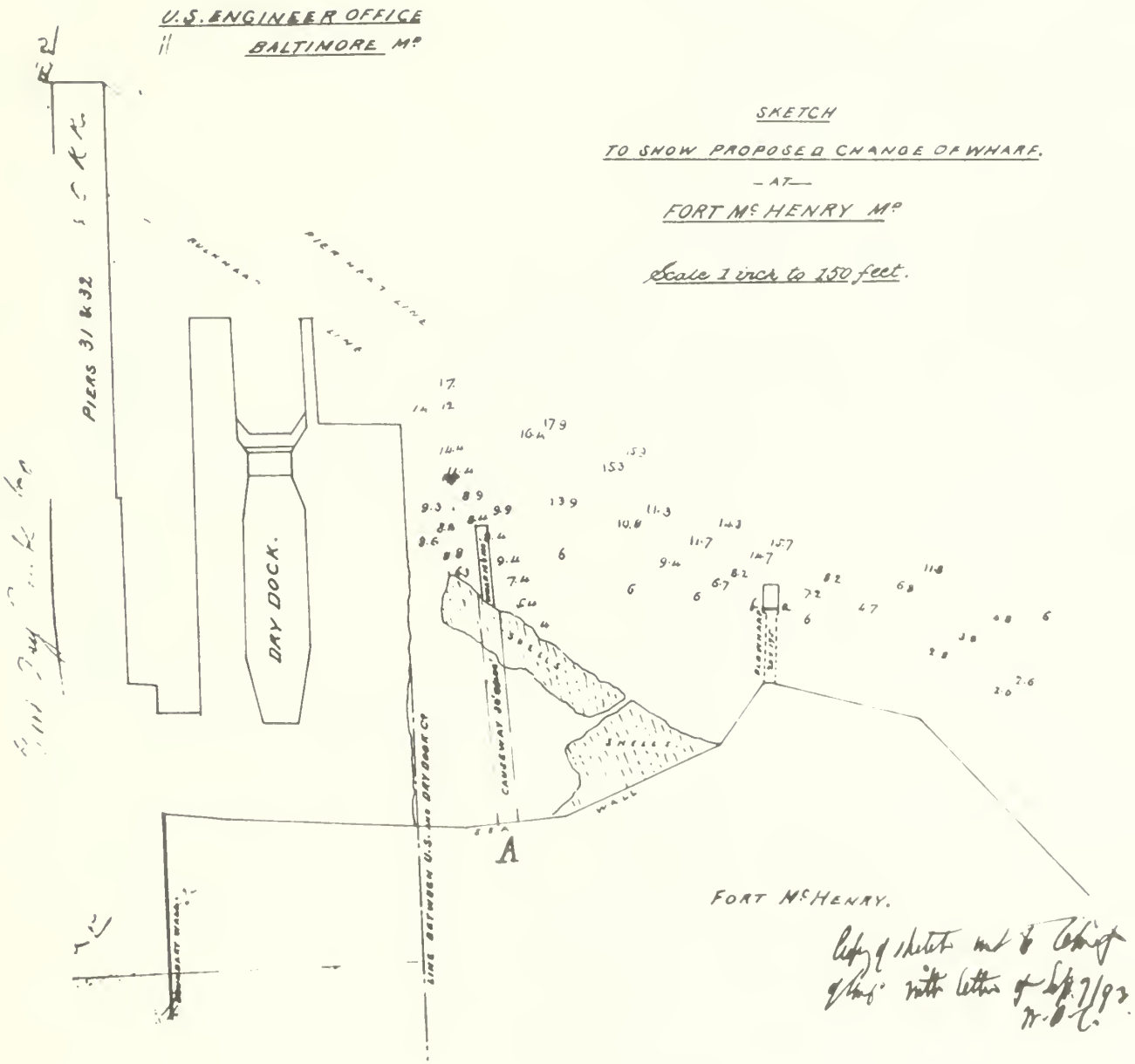

PLAN OF
FORT McHENRY
DECEMBER. 1868.

Illustration 13. Sketch to show proposed change of wharf at Fort McHenry 1893



Copy of sketch sent to Chief of Engrs with letter of Sept 7/93.
W.D.C.

Illustration 14. Fort McHenry, Maryland 1912

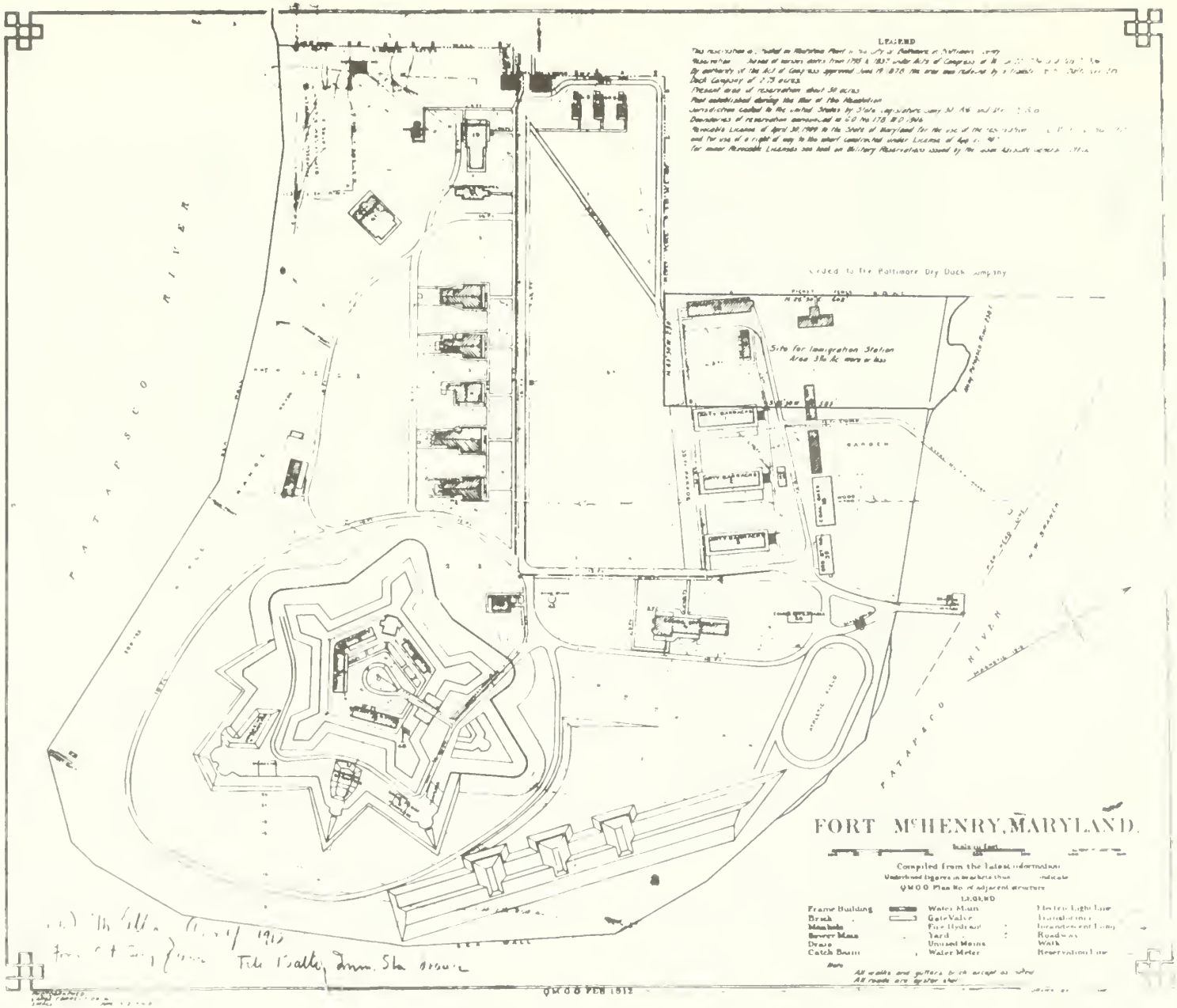

LEGEND
Site for Immigration Station
Area 3½ A. more or less
PATAPSCO RIVER
FORT McHENRY, MARYLAND.
Compiled from the latest information
Frame Building
Brick
Water Main
Gate Valve
Fire Hydrant
Yard
Unused Mains
Water Meter
Roadways
Walk
Reservation Line

Illustration 15. 1910 postcard showing seawall
John H. McGarry Collection

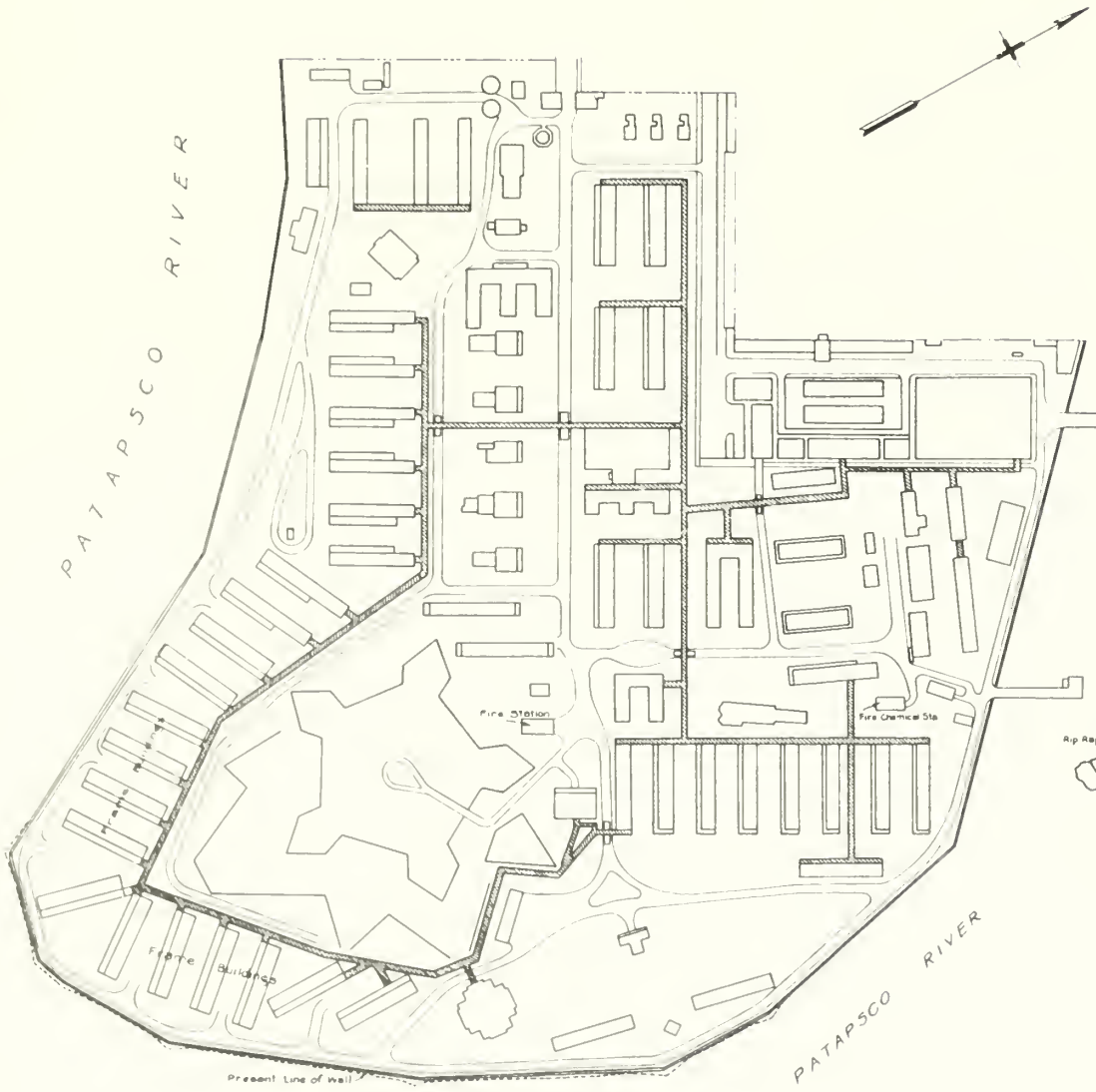
Illustration 16. 1920 postcard showing seawall
John H. McGarry Collection

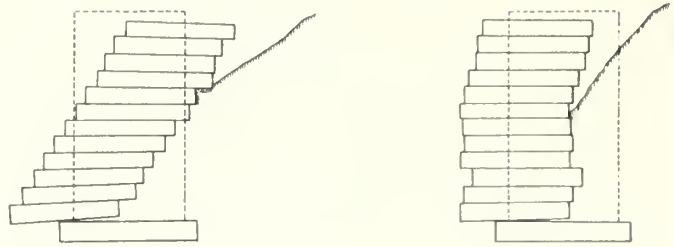
Fort McHenry, Baltimore, Md.

Panorama View, Historic Fort McHenry, Baltimore, Md.

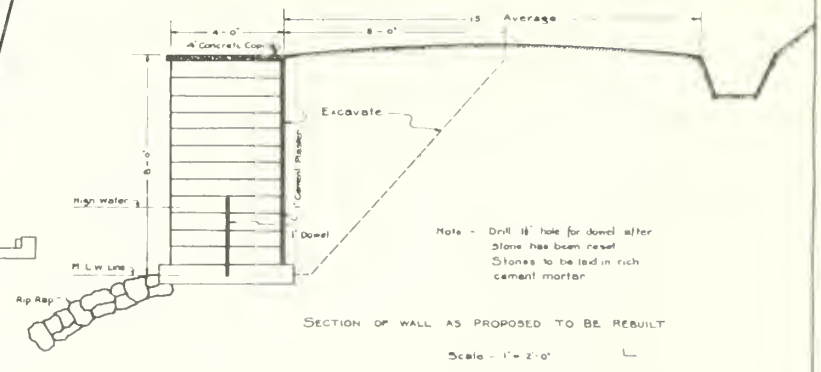
4A H496

Illustration 17. General Hospital No. 2, Fort McHenry, Maryland. Seawall 1919





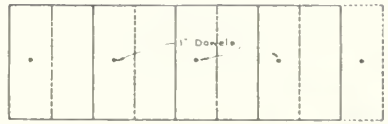
EXAMPLES OF PRESENT CONDITION OF WALL



Note - Drill 1½" hole for dowel after stone has been reset. Stones to be laid in rich cement mortar

SECTION OF WALL AS PROPOSED TO BE REBUILT

Scale - 1" = 2'-0"



CONSTRUCTION DIVISION WAR DEPT. - WASHINGTON, D. C.

GENERAL HOSPITAL NO 2
FORT McHENRY, MARYLAND
SEAWALL

JOB No. 8605 DATE JULY 23, 1919

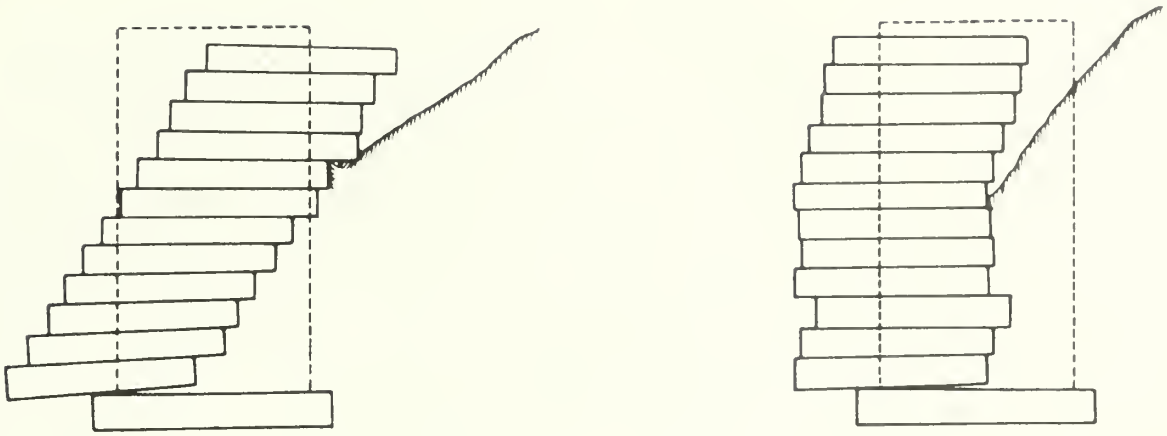
PLAN No. 101 APPROVED BY [signature] CHIEF ENGINEER

DATE	REVISIONS	DRAFT BY	APPROVED

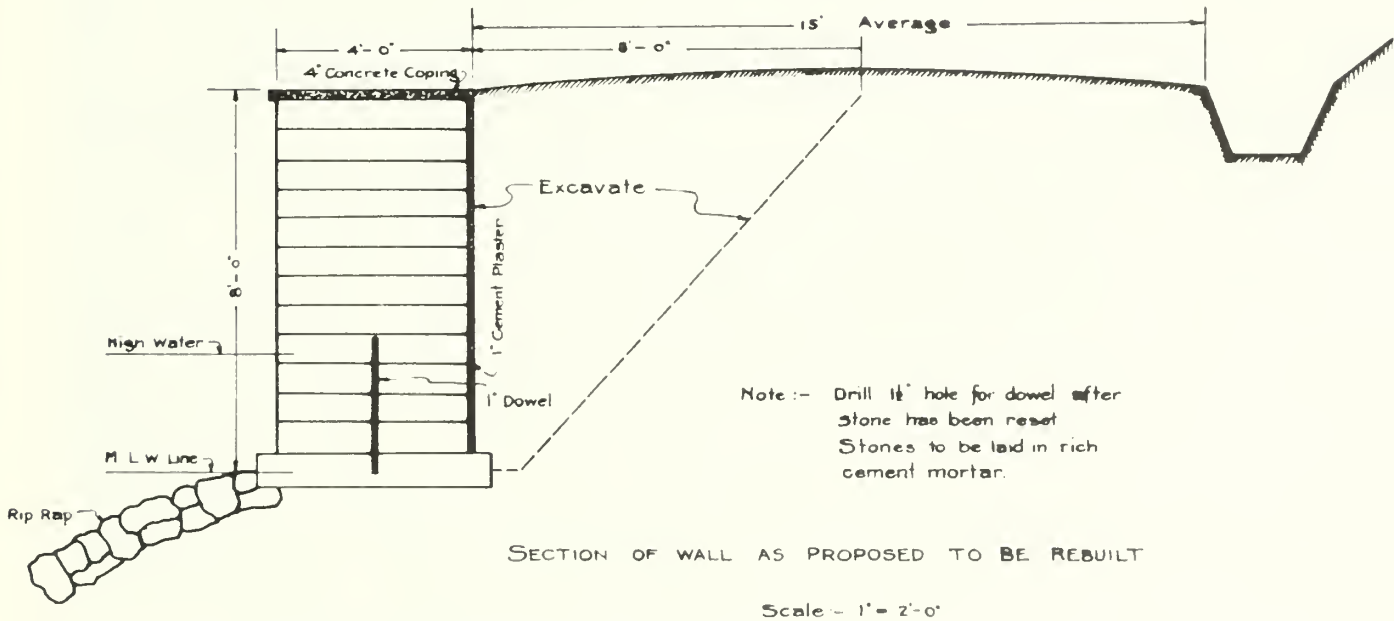
DESIGNED BY [signature] DRAWN BY [signature] TRACED BY [signature] PLAN NUMBER 101

Note - To accompany Report by L. S. Munson

Illustration 18. Seawall 1919, Detail



EXAMPLES OF PRESENT CONDITION OF WALL



Note :- Drill 1½" hole for dowel after stone has been reset
Stones to be laid in rich cement mortar.

SECTION OF WALL AS PROPOSED TO BE REBUILT

Scale :- 1" = 2'-0"

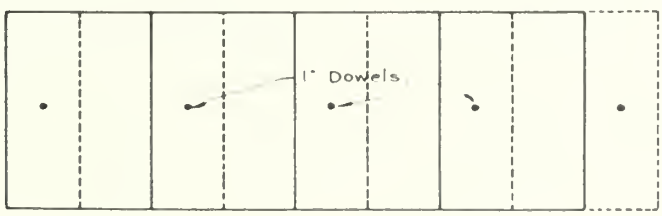


Illustration 19. Aerial view, General Hospital, No. 2, c. 1925

Illustration 20. Repairs--seawall, sidewalk, etc., damaged by storm, August 23, 1933

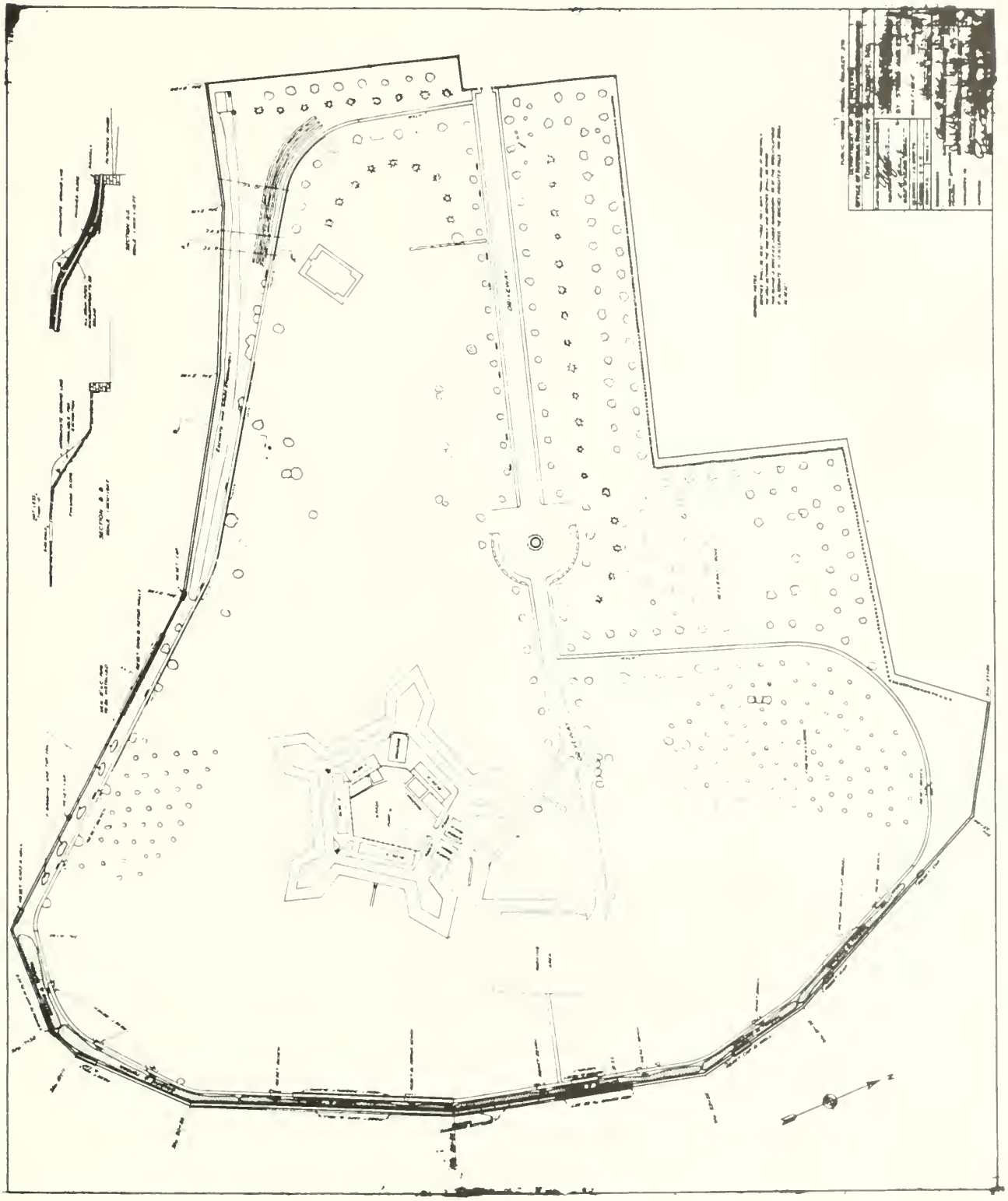
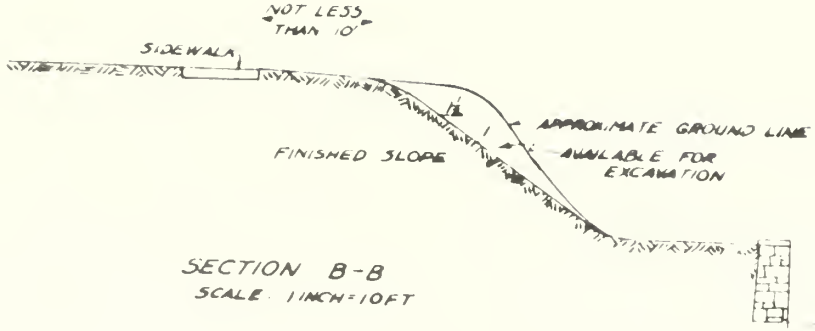
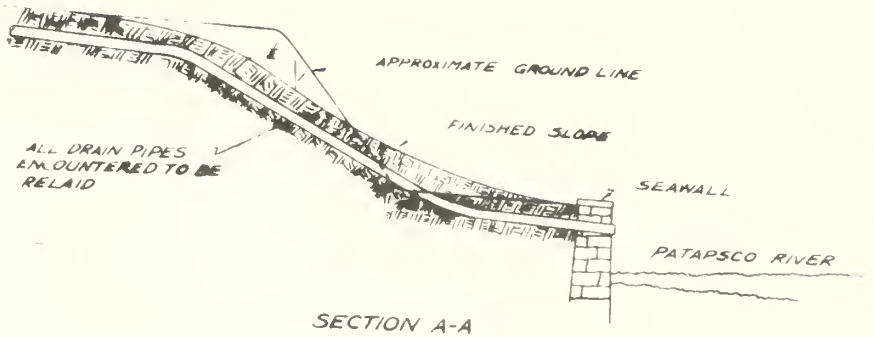


Illustration 21. 1933 seawall repair, Detail

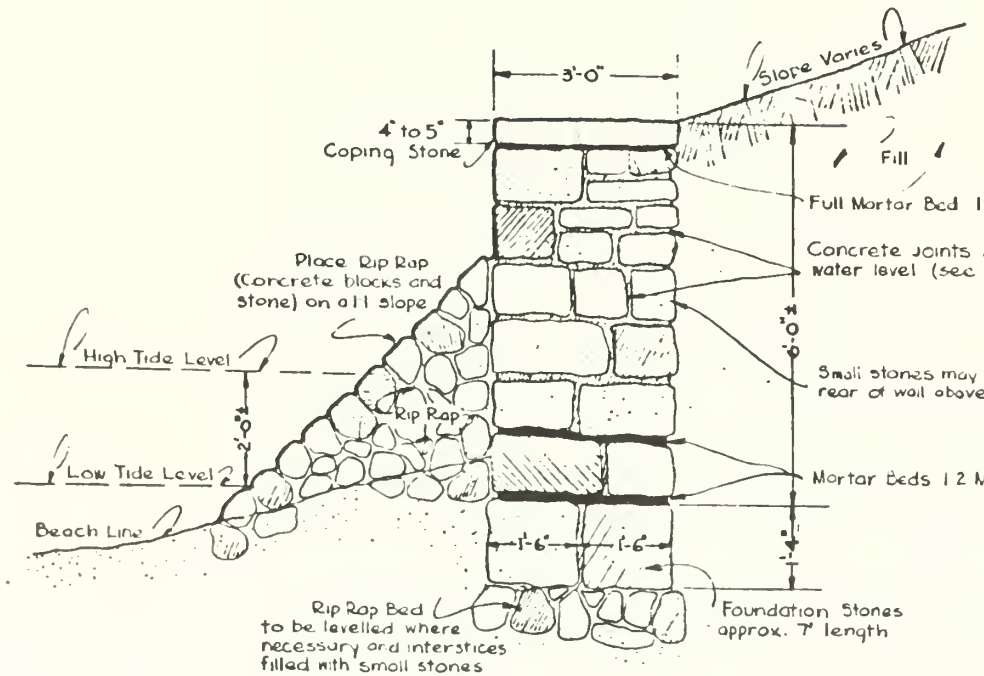


SECTION B-B
SCALE: 1 INCH = 10 FT



SECTION A-A
SCALE 1 INCH = 10 FT

Illustration 22. Fort McHenry National Park stone walls, 1937



SECTION
Scale ½"=1'-0"

Concrete Joint Specifications

Mix 1:2:4 Size of coarse aggregate to pass ½" sieve and be retained on ¼" sieve

Note: All vertical joints below high tide to be rodded concrete joints. Work to be done during low tide, allow 24 hours setting time.

R O Revision 10-1-37

Recommend use of high early strength cement for all mortar and concrete below high tide. Ordinary Portland cement to be used above high tide.

DATE	PREPARED BY: BRANCH OF ENGINEERING	DESIGNED BY: F.J.G	U.S. DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE FORT Mc HENRY NATIONAL PARK STONE WALLS (REPAIRS TO SEA WALL) JOB NO. 1-C.C.C. CLASS 154 E-R-A-MD-5 SCALE AS SHOWN PREPARED BY BRANCH OF ENGINEERING	DATE: 9-21-37
DATE	RECOMMENDED George A. Palmer SUPERINTENDENT, FT. McH. N.P.	DRAWN BY: F.J.G		SHEET 1 OF 1
DATE	APPROVED Herbert Evison Acting Regional DIRECTOR	TRACED BY A.J.R		DWG. NO. NP-MCH 4-001
		CHECKED BY: F.J.G		

Illustration 23. Photograph of 1938 pointing on seawall

Illustration 24. Photograph of pre-1948 seawall damage

Illustration 25. Photograph of pre-1948 seawall damage


FME-124

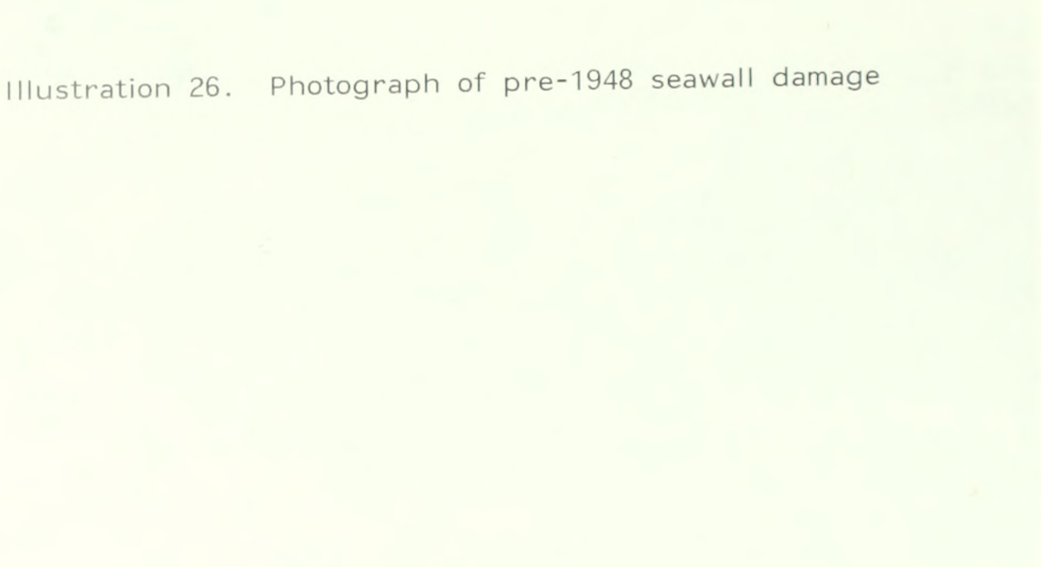


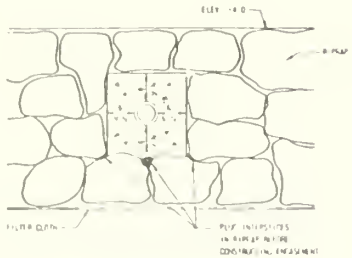
Illustration 26. Photograph of pre-1948 seawall damage


91

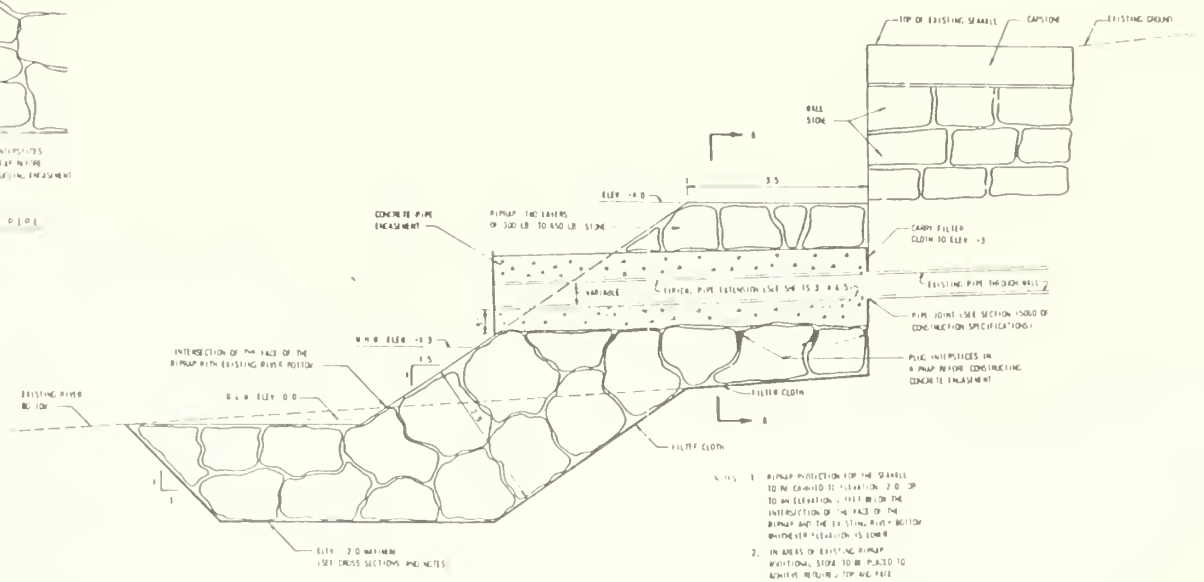
Illustration 27. Photograph of August 1955 seawall damage from hurricane "Connie"

Illustration 28. Photograph of August 1955 seawall damage from hurricane "Connie"

Illustration 29. Detail of 1974 riprap protection for the seawall proposal

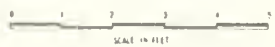


SECTION A-A
CONCRETE ENCASEMENT FOR PIPE



NOTES:
1. RIPRAP PROTECTION FOR THE SEAWALL TO BE CONSTRUCTED TO AN ELEVATION 2.0 FT TO AN ELEVATION 2 FEET BELOW THE INTERSECTION OF THE FACE OF THE RIPRAP AND THE EXISTING RIVER BOTTOM WHICHEVER ELEVATION IS LOWER
2. IN AREAS OF EXISTING RIPRAP ADDITIONAL STONE TO BE PLACED TO ACHIEVE REQUIRED TOP AND SIDE CONFIGURATION (SEE CROSS SECTIONS)
3. NO EXCAVATION OF THE EXISTING RIPRAP SECTION SHALL BE PERFORMED IN THE VICINITY OF THE EXISTING UTILITIES BETWEEN THE FOLLOWING STATIONS
   18+62 TO 19+15
   19+10 TO 20+05
   30+56 TO 31+00

RIPRAP PROTECTION FOR THE SEAWALL



TYPICAL DETAILS
RIPRAP PROTECTION
CONCRETE ENCASEMENT

PREPARED
DESIGNED
DRAWN
CHECKED

DRAWING NO.
SHEET
2
OF 5

APPENDICES

A. Building a Sea=Wall, Contract, August 1896

B. Daily Journal of Operations on Fort McHenry, 1896

No

PROPOSAL OF

OPENED AUGUST 7, 1896.

Building a Sea-Wall

Making Repairs

Fort McHenry,

MD.

PROPOSALS

FOR

Building Sea-Wall and Making Repairs at Fort McHenry.

U. S. ENGINEER OFFICE,

10 Pleasant Street, Baltimore, Md., July 17, 1896.

Proposals for building a Sea-Wall and making repairs at Fort McHenry, Baltimore, Md., will be received until noon of August 7, 1896, and then opened.

For information apply to

PETER C. HAINS,

Colonel Corps of Engineers, U. S. A.

SPECIFICATIONS.

GENERAL INSTRUCTIONS FOR BIDDERS.

1. The attention of bidders is especially invited to the acts of Congress approved February 26, 1885, and February 23, 1887, as printed in vol. 23, page 332, and vol. 24, page 414, United States Statutes at Large, which prohibit the importation of foreigners and aliens, under contract or agreement, to perform labor in the United States or Territories or the District of [redacted]

2. Preference will be given to articles or materials of domestic production, conditions of quality and price being equal, including in the price of foreign articles the duty thereon.

3. Maps of the localities may be seen at this office. Bidders, or their authorized agents, are expected to visit the place and to make their own estimates of the facilities and difficulties attending the execution of the work, including the uncertainty of weather and all other contingencies.

4. No proposal will be considered unless accompanied by a guaranty in manner and form as directed in these instructions.

5. All bids and guaranties must be made in triplicate upon printed forms to be obtained at this office.

6. The guaranty attached to each copy of the bid must be signed by two responsible guarantors, to be certified as good and sufficient guarantors by a Judge or clerk of United States Court, United States District Attorney, United States Commissioner, or Judge or clerk of a State court of record, with the seal of said court attached.

7. A firm as such will not be accepted as surety, nor a partner for a copartner or firm of which he is a member. Stockholders who are not officers of a corporation may be accepted as sureties for such corporation. Sureties must be citizens of the United States.

8. Each signature to guaranties and bonds shall have affixed to it an adhesive seal. All signatures to proposals, guaranties, contracts and bonds should be written out in full.

and each signature to guaranties, contracts and bonds should be attested by at least one witness, and, when practicable, by a separate witness to each signature.

9. Each guarantor will justify in the sum of two thousand dollars. The liability of the guarantors and bidder is determined by the act of March 3, 1883, 22 Statutes, 487, chap. 120, and is expressed in the guaranty attached to the bid.

10. A proposal by a person who affixes to his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal, is the proposal of the individual. That by a corporation should be signed with the name of the corporation, followed by the signature of the president, secretary or other person authorized to bind it in the matter, who should file evidence of his authority to do so. That by a firm should be signed with the firm name, either by a member thereof or by its agent, giving the names of all members of the firm.

11. The place of residence of every bidder, and post-office address, with county and State, must be given after his signature.

12. All prices must be written as well as expressed in figures.

13. One copy each of the advertisement, the instructions for bidders, and the specifications, all of which can be obtained at this office on application by mail or in person, must be securely attached to each copy of the proposal and be considered as comprising a part of it.

14. Proposals must be prepared without assistance from any person employed in or belonging to the military service of the United States or employed under this office.

15. No bidder will be informed, directly or indirectly, of the name of any person intending to bid or not to bid, or to whom information in respect to proposals may have been given.

16. Any one signing the proposal as the agent of another or others must file with it legal evidence of his authority to do so.

17. All blank spaces in the proposal and bond must be filled in, and no change shall be made in the phraseology of the proposal, or addition to the items mentioned therein. Any conditions, limitations, or provisos attached to proposals will be liable to render them informal, and cause their rejection.

18. Alterations by erasure or interlineation must be explained or noted in the proposal over the signature of the bidder.

19. If a bidder wishes to withdraw his proposal he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and, when reached, it shall be handed to him or his authorized agent, unread.

20. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

21. No bids received after the time set for opening of proposals will be considered.

22. The proposals and guaranties must be placed in a sealed envelope marked "proposal for repairs at Fort McHenry," and inclosed in another sealed envelope addressed to Col. Peter C. Hains, Corps of Engineers, 9 Pleasant street, Baltimore, Md. The outer envelope must be so indorsed as to indicate before being opened the particular work for which the bid is made.

23. The United States reserves the right to reject any and all bids, and to waive any informality in the bids received; also to disregard the bid of any failing bidder or contractor known as such to the Engineer Department.

24. The bidder to whom award is made will be required to enter into written contract with the United States, with good and approved security, in an amount of two thousand dollars within ten (10) days after being notified of the acceptance of his proposal.

25. The contract which the bidder and guarantors promise to enter into shall be, in its general provisions, in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office, and will be furnished if desired to parties proposing to put in bids. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

26. The sureties are to make and subscribe affidavits of justification on the back of the bond to the contract, and they must jointly justify in double the amount of the penalty.

27. Bidders are invited to be present at the opening of the bids.

GENERAL CONDITIONS.

28. A copy of this advertisement, specifications and instructions will be attached to the contract, and form a part of it.

29. The contractor should, within ten days from the award of the contract, furnish the office with the post-office address to which communications should be sent.

30. Transfers of contracts, or of interests in contracts, are prohibited by law.

31. The contractor will not be allowed to take advantage of any error or omission in these specifications, as full instructions will always be given should such error or omission be discovered.

32. The decision of the Engineer Officer in charge as to quality and quantity shall be final.

33. It is understood and agreed that the quantities given are approximate only, and it must be understood that no claim shall be made against the United States on account of any excess or deficiency, absolute or relative, in the same. Bidders are expected to examine the drawings, and are invited to make the estimate of quantities for themselves.

34. Payments will be made monthly. A percentage of ten (10) per centum will be retained from each payment until the completion of the contract.

35. Should the time for the completion of the contract be extended, all expenses for inspection and superintendence during the period of the extension, the same to be determined by the Engineer Officer in charge, shall be deducted from payments due or to become due to the contractor; *Provided, however*, that if the party of the first part shall, in the exercise of his discretion, because of freshets, ice, or other force or violence of the elements, allow the contractor additional time in writing as provided for in the form of contract, there shall be no deduction for the expenses for inspection and superintendence for such additional time so allowed; *Provided, further*, that nothing in these specifications shall affect the power of the party of the first part to annul the contract as provided for in the form of contract adopted and in use by the Engineer Department of the Army.

SPECIAL DESCRIPTION.

36. It is understood and agreed that the contractor must carry on the work in such order of precedence as the Engineer may direct, and that the Engineer shall have the right at any time to make such changes in the plans as he may deem necessary, and further, that the contractor shall have or make no claim against the United States on account thereof.

37. GENERALLY.—it is proposed to build, as shown on drawing exhibited in the United States Engineer Office, 9 Pleasant street, Baltimore, a protection or sea-wall on the north front of the Reservation at Fort McHenry and make repairs hereafter described. The wall is to be four feet thick at base, three feet at top, and will be carried to the same height as the wall, of which it will form a prolongation, viz., five and nineteen hundredths (5.19) feet above mean low water to top of coping. It will be founded on a bed of riprap stone, the top surface to be at the level of mean low water.

38. MASONRY.—The wall will be constructed of sound gneiss or granite, well-shaped stones, of not less than 12 inches rise *front or back* (except for leveling up), well-bonded, and having through headers for every six square feet of face area. Stone to be laid dry to within about two feet of the lower face of the coping, beyond which it will be bedded in cement mortar same as for coping. The heavier stone will be laid in the lower courses and the whole will form what is known as first-class rubble masonry. The general character of the wall will be similar to that recently constructed on the south side of the Reservation.

39. COPING.—The coping will be six inches thick and three feet wide, in not less than four foot lengths, hammer-dressed on top face and close jointed at right angles to face of wall. It will be set in a heavy bed of hydraulic cement, to be approved by the Engineer in charge, mixed with twice its volume of clean, sharp sand.

40. RIP-RAP.—Will include rip-rap stone, the removal of three wrecks at and near the line of the proposed wall; the excavation of all trenches, and the entire preparation of the bed to receive the wall.

41. RIP-RAP STONE.—The rip-rap will be of sound hard stone ranging from about one hundred and fifty pounds in weight to small spalls of two or three pounds.

The bed will be laid nine feet wide at the top, in no case less than two feet deep, and sloping off to the ground at a natural slope of about one on one. When the ground is not sufficiently low to permit the full depth of two feet being laid, a trench of rectangular section will be excavated at the contractor's own cost, to enable the required two feet to be laid. The top surface of the bed will be properly leveled to receive the wall.

42. WRECKS.—There are three wrecks near the line of the proposed wall which will be entirely removed to the level of the ground and from the vicinity by the contractor.

43. FILLING.—Will include oyster shell filling, earth filling, the planting of trees, the sowing of grass seed, and the repair and continuation of all drains through the proposed wall, whose discharge is interfered with.

44. OYSTER SHELLS.—Throughout its entire length the space immediately back of the wall is to be filled with good clean oyster shells to about three feet above mean low water, and extending back at the top for a distance of about three feet from the wall, thence sloping off at the natural slope. The fill of oyster shells may at the option of the engineer be extended to other parts of the area to be filled.

45. EARTH FILLING.—The space back of the sea-wall, as shown on drawings exhibited in this office, or such part thereof as the engineer may designate, will be filled to the height of about five feet above mean low water in rear, and sloped off to about four feet above mean low water at the wall; with good clean earth to be well settled in place, to the satisfaction of the engineer. The top surface of this fill for the depth of about one foot must be of good rich soil, and sown with a good grade of grass seed by the contractor. Where the wall is built on dry ground, the earth in front of the wall will be excavated to the level of mean low water, and this excavated material used for filling in behind. This material will be paid for as "Fill."

46. TREES.—About thirty young poplar trees or such other kind as the engineer may approve will be planted by the contractor along the proposed sea-wall front, to the satisfaction of the engineer.

47. DRAINS.—The contractor will be required to extend through the proposed wall the drains or sewers whose discharge had been interfered with. The pipe must be of the best quality double-strength vitrified culvert pipe of the same diameter as the drains to which they are joined. They will be properly jointed in the wall with iron pipe, and the whole to be properly caulked with hydraulic cement and laid to the satisfaction of the engineer. Any broken parts of the existing drains will be repaired by the contractor.

Near the west end of the wall an opening about four feet wide and extending down to about the level of mean low water will be left as a drain until the earth fill back of the wall shall have progressed to the satisfaction of the engineer, when he will authorize its proper closing, so that it will, when closed, be of the same character as the adjacent wall.

48. FINALLY.—The whole work is to be completed in strong, neat and workmanlike manner, and in accordance with the evident intent and meaning of this specification.

49. BIDDERS TO VISIT THE SITE, ETC.—It is expected that each person bidding will visit the site of the proposed wall and the United States engineer's office, and ascertain the nature and general character of the work to be performed, and all information necessary to enable him to make an intelligent proposal.

50. The contractor will be allowed, without cost, to use such of the stone of the old sea-wall as may be suitable in building the new one.

MEASUREMENT OF WORK.

51. MASONRY.—Masonry will be measured by the cubic contents of the wall in place, built in accordance with these specifications. Masonry will not include coping.

COPING.—Coping will be measured in place by the linear foot.

RIP-RAP.—Rip-Rap will be measured by cross section taken before and after it is deposited. No allowance will be made for settlement.

FILL.—Fill will either be measured in carts whose cubic contents have been previously determined under the direction of the engineer, or, if brought in scows, by the cubic contents of the space that it occupies on the scow.

52. BIDS.—Bids must state in letters and figures:

(1) Price per cubic yard for masonry in place.
(2) Price per linear foot for coping in place.
(3) Price per cubic yard for rip rap in place.
(4) Price per cubic yard for oyster shell filling in place.
(5) Price per cubic yard for earth filling in place.
(6) Time of commencement and completion of work.

53. The contractor will be required at his own expense, before the final payment for the work, to repair and put in same order and condition as before he commences operations, all wharves, roads and parts of the ground or reservation used or occupied by him during the progress of the work

54. QUANTITIES.—The estimated quantities (which may be in increased or diminished) are:

2,400 cubic yards of rip rap.
383 cubic yards of masonry.
655 linear feet of coping.
660 cubic yards of oyster shell filling.
30,000 cubic yards of earth filling.

55. The engineer, at his discretion, may require the dismissal of any incompetent, insubordinate or disorderly person employed, who shall not again be connected with the work.

PROPOSAL.

. 1896.

To Col. **PETER C. HAINS.**

Corps of Engineers U. S. A.,

9 Pleasant Street, Baltimore Md.

SIR:—

In accordance with your advertisement of July 17, 1896, inviting proposals for building sea-wall, etc., at Fort McHenry, and subject to all the conditions and requirements thereof, and of your specifications of same date, copies of both of which are hereto attached, and so far as they relate to this proposal are made a part of it, I (or we) propose to do the work at the following prices:

Rip-rap in place, for.....per cubic yard.

Masonry in place, for.....per cubic yard.

Coping in place, for.....per linear foot.

Oyster shell filling in place, for.....per cubic yard.

Earth filling in place, for.....per cubic yard.

I (or we) will commence on.....

I (or we) will complete the work by.....

I (or we) make this proposal with a full knowledge of the work, and, if the proposal is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days thereafter with good and sufficient sureties for the faithful performance thereof.

WITNESS: [SIGNATURE.]

[ADDRESS.]

[SIGNATURE.]

[ADDRESS.]

GUARANTEE.

We

of , in the County of

and State of , and , of

, in the County of and State of

, hereby undertake that if the bid of

herewith accompanying, dated 189[illegible],

for work at Fort McHenry, Md.

be accepted as to any or all of the items of supplies, materials, and services proposed to be furnished thereby, or as to any portion of the same, within sixty days from the date of the opening of proposals therefor, the said bidder will, within ten days after notice of such acceptance, enter into a contract with the proper officer of the United States to furnish such articles of supplies and materials and such services of those proposed to be furnished by said bid as shall be accepted, at the prices offered by said bid and in accordance with the terms and conditions of the advertisement inviting said proposals, and will give bond with good and sufficient sureties for the faithful and proper fulfillment of such contract. And we bind ourselves, our heirs, executors, and administrators, jointly and severally, to pay to the United States, in case the said bidder shall fail to enter into such contract or give such bond within ten days after said notice of acceptance, the difference in money between the amount of the bid of said bidder on the articles or services so accepted and the amount for which the proper officer of the United States may contract with another party to furnish said articles and services, if the latter amount be in excess of the former.

Given under our hands and seals this day of

eighteen hundred and ninety-

In presence of—

as to

as to

Affix adhesive seal.

STATE OF }
County of } ss:

I, , one of the guarantors named in the foregoing guaranty, do swear that I am pecuniarily worth the sum of two thousand dollars over and above all my debts and liabilities.

Subscribed and sworn to before me this day of

, 189 , at

STATE OF)
) ss:
County of)

I, _____ one of the guarantors named in the foregoing guaranty, do swear that I am pecuniarily worth the sum of two thousand dollars over and above all my debts and liabilities.

Subscribed and sworn to before me this _____ day of _____, 189 , at _____

I, _____, do hereby certify that _____ and _____, the guarantor above named, personally known to me, and that, to the best of my knowledge and belief, he is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

I, _____ do hereby certify that _____, the guarantor above named, is personally known to me, and that the best of my knowledge and belief, he is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

[1] The oath to be taken before a notary public or some other officer having general authority to administer oaths. If the officer has an official seal it must be affixed, otherwise the proper certificate as to his official character must be furnished.

[2] This certificate to be by a judge or clerk of a United States court, a United States district attorney, United States commissioner, or a judge or clerk of a State court of record with the seal of said court attached. If the official can make the certificate as to both sureties, it will not be necessary to fill out the next form below.

[3] He or each.

Daily Journal of Operations on Fort McHenry Md.

Date.	Number of men employed.	Occupation.	How Employed	Quantity of rock stone.	Kind of Machinery used by Contractor	Remarks.
August 31	Four four (4) Horses (4) men employed	Unloading stone, digging trench, filling in. and taking out stone from old work.	Tile	about 122.22 cuyds Rip rap.	Scow.	One load. Scow No 5 dimensions 60'x(22'-11"+3'6"
Sept 1			" "	136 5 cuyds Rip rap	"	one load Scow No 143. dimensions 67'x(23'-4"-22') x 2'6"
Sept 5			"	94.10 cuyds Rip rap	"	one load Scow no 143 dimensions 66'x(23'6"-22') x 1'8"
Sept 9			"	216.28 cuyds Rip rap	"	One load Scow No 62. dimen 74'(24'-22'6") x 3'6"
Sept 12			" & excav.	Dry trench 65'x 9'x(2 below M.S.W) filled in with Rip rap partly from old wall & scows.	"	
Sept 14 /			"	252.4 cuyds Rip rap	"	one load Scow No 62.
			"	47.67 " Dirt	"	dimen. 72'(24'-22'6") x 4' On Scow No 74.
Sept 15			"	138.1 cuyds Dirt		dimen 20'x16'x3'3" + 18'x12'6"x2'10"
			"	138.1 " "		On scow Nos 5-161 dimen 40'x(22'6"-13'3") x 4'
Sept 16			"	184.08 " "		on Scow No 94.
Sept 17				10 cyds - Tile with rip rap. of exc. trench		dimen. 60'x(21'-20'6") x 4' one Scow No 33 dimen. 22'6"x6'x2'
Sept 22			Excav. of trench & taking out old wall for use.	trench 15'x 10'x 2H below S.W	Scows derrick	Excavated trench 60'x 9'x 2'7" filled with Rip rap.
Sept 24			Tile. Rip rap.	about 220 cuyds	Scow	about 11 cuyds Excav about 220 cuyds. dimen 64'x23'x4"
Sept 28			Tile Oyster shells	about 220 cuyds.	Scow	Estimate for payment for September 6+0.7 648 cuyds dirt fill 238 " " oyster shell fill.
Sept 30			Tile. Earth.	about 181 cuyds.	Scow.	

Seawall.

Oct 17
Length of wall built in place. 56'
" Capping laid 27'
Rip rap in place 200'
Oct 31st 1896
Length of Wall built in place 200 ~~466~~ ' (for measurement)
" " " 3' high 40'
Rip rap in place 500' (380 ft for measurement)

DATE	KIND MATERIAL	CU. YARDS	REMARKS
✓	Balance	9724.13	✓
27 ✓	Shell	306.98	✓
27 ✓	Shell	345.05	✓
28 ✓	"	307.32	✓
28 ✓	"	174.27	✓
28 ✓	"	317.00	✓ 322.10
29 ✓	"	113.66	✓
29 ✓	"	250.10	✓
29 ✓	"	238.89	✓
30 ✓	"	250.20	✓
31 ✓	"	179.01	✓
31 ✓	"	429.63	✓
	Total	12636.14	✓

Total 12,636.14 Cu yds
Dirt 654.

Shell = 11,982.
654
(-) 36

Nov. 5-1896.

Estimate for Rip rap in place at
H. McHenry. Work of Oct. 1896.
Estimate for final payment - by cross section.
Sta 0 at the beginning of wall at 1st wharf.

Station	Average Area Cross Sect	Quantity, Rip Rap	Remarks.
0+10	15.41 □′	5.82 cu yds.	
10+20	21.4 □′	8.00 "	
20+40	26. □′	19.20 "	
40+60	31.6 □′	23.40 "	
60+80	84.3 □′	25.40 "	
80+100	36.55 □′	27.10 "	
100+120	39.8 □′	29.5 "	
120+140	43.8 □′	32.4 "	
140+160	49.75 □′	36.8 "	
160+180	55.85 □′	41.3 "	
180+200	59.15 □′	43.8 "	
200+220	64.4 □′	47.7 "	
220+240	70.7 □′	52.3 "	
240+260	74.3 □′	55.0 "	
260+280	76.3 □′	56.5 "	
280+300	77. □′	57.0 "	
300+320	69.6 □′	51.2 "	
320+340	61.0 □′	45.1 "	
340+360	55.45 □′	41.0 "	
360+380	45.25 □′	33.3 "	
		731.8	
		> 732 cu yds.	

Daily Journal of Operations on Fort McHenry Maryland for October 1896.

Date.	No. of men employed	Occupation.	How Employed.	Quantity of work done	Kind of machine used by Contr.	Remarks.
October 1st - 10th	From 10 to 16 men	Lab & masons	Unloading scows, at work laying rip rap and building sea wall	Oyster shell fill 1658.4 cu yds; Dirt fill 368.4 cu yds	Scows derrick	
Oct 11th to 20th	From 15 to 20 men	Lab & masons	Unloading scows, building sea wall	About 60 ft wall built. Oyster shell fill 1538.9 cu yds; Dirt fill 286.0 cu yds	Scows derrick	
October 21st - 31st	From 08 to 48 men	Lab & masons	" " " " Plowing & scraping Excavation East of wharf.	Oyster shell fill 5880 cu yds; About 90 feet of wall built; About [illegible] ft. rip rap in and about 380 ft. leveled.	Scows plow and scraper derrick	

Estimated quantities for final payment for October 1896.
Rip rap in place 380 lin feet — 732 cu yds of rip rap

Sea wall completed 200 linear feet 125.2 cu yds masonry.
Coping in place 200

Earth filling in place 654. cu yds
Oyster shell filling in place 11,982. cu yds.

Daily Journal of Operations in Jno McHenry November 1896.

Date.	No of men Employed	Occupation.	How Employed.	Quantity of work done	Kind of machines used by Contractor.	Remarks.
Tue (10th to 10th)	Six bright men	on sea wall. Masons and lab.	masons and lab.			
		Masons and lab.		About 371 cu yds oyster shell fill.	Derrick, scows Carts.	
	Six hoisters unloading scows	Lab.	lab.	235 cu yds earth fill 140 lin ft. riprap placed.		
	5 carts - drivers and attendants	lab.	lab.	76 ft. additional wall built up to 4 ft. M.L.W. 76 ft more to 3'6" M.L.W.		
Wed (11th to 20th)	Eight to fourteen men	on sea wall. masons and lab.				
		Lab. and Masons.		200 lineal ft wall completed with coping let. 124 feet wall completed without coping. 20 additional feet of wall to 3'4" M.S.W. About 550 lin ft. riprap in place 552 cu yds oyster shell fill - 3288 cu yds dirt fill: 1530 cu yds dirt fill deposited on East side reservation wharf.	Derrick scows Carts	
	25 to 33 carts and attendants	hauling dirt behind wall.	lab.			
	23 to 35 carts and attendants	hauling dirt on East side of wharf	lab.			
Thu (12th to 20th)	Fourteen to ten men	on sea wall	masons and lab.			
	Seven to twelve men	Lab	unloading scows.			
	25 carts and attendants	lab.	filling in behind wall.			
	25 to 35 carts and attendants unloading	lab.	filling in on East side reservation wharf			

Estimate of material placed during month:

Rip rap in place	347 cu yds
Masonry	149 "
Oyster Shell Dirt	2011 "
	4156 "

East Side Reservation wharf.

Oyster shell	260 cu yds
Dirt	3422 "

ANNOTATED BIBLIOGRAPHY

HISTORICAL AND ARCHEOLOGICAL RESEARCH PROJECT (HARP) MATERIALS

Manuscript

Record Group-77, Office of the Chief of Engineers, Letters Sent, 1812-1872, Letters Received, Orderly Books, Annual Reports to the Secretary of War, (including Report of the Chief of Engineers), "SPLOE," Buell's Collection, Engineer Historical Papers, 1800-1819, Reports, "FB," "BDO," Land Papers [?].

Record Group-92, Office of the Quartermaster General, Consolidated Correspondence File.

Record Group-94, Adjutant General's Office, Correspondence, FM, 1927-1937.

Record Group-107, Office of the Chief of Engineers, "SC FT-MC," 1811-1837; Office of the Secretary of War, Letters Received.

Record Group-159, Office of the Inspector General, Letters Received, 1866-1889.

Microfilm

Reel 16, National Archives, Records of the War Department, Office of the Chief of Engineers, Selected Correspondence Relating to Fort McHenry, Maryland, 1811-1837.

Reel 24, National Archives, Records of the War Department, Office of the Chief of Engineers, Selected pages from Letters to Officers of Engineers, July 4, 1812 - February 20, 1869.

Reel 35, National Archives, Records of the War Department, Office of the Chief of Engineers, Fortifications Branch, Letters Received, 1878-1886.

Reel 42, National Archives, Records of the War Department, Office of the Chief of Engineers, Selected Documents from Fortifications, Miscellaneous Reports, Baltimore District Office, 1884-1906.

> National Archives, Records of the War Department, Office of the Chief of Engineers, Selected Documents from Fortifications, Miscellaneous Reports, Baltimore District Office.

Reel 45, National Archives, Records of the War Department, Office of the Adjutant General, Medical History, Post of Fort McHenry.

Reel 46, National Archives, Records of the War Department, Office of the Chief of Engineers, Selected Letters received relating to Fort McHenry, Maryland 1852-1876.

Reel 49, National Archives, Records of the War Department, Office of the Chief of Engineers, 1847-1906, General Correspondence, Letters Sent, July 8, 1863 - May 24, 1867.

Reel 53, National Archives, Records of the War Department, Office of the Chief of Engineers, Miscellaneous Letters Received, May 1877 - May 1905.

Reel 56, National Archives, Records of the War Department, Office of the Chief of Engineers, District Engineer Office, Baltimore, Maryland, 1847-1906, Fort McHenry Correspondence, Letters Sent, December 15, 1884 - June 30, 1894 (no. 2).

National Archives, Records of the War Department, Office of the Chief of Engineers, Letters Sent, Baltimore District Office, Fort McHenry Correspondence, December 22, 1869 - December 2, 1881, December 15, 1884 - February 28, 1898.

The HARP materials provided almost all of the data for this historic structure report. The War Department, Office of the Chief of Engineers records provided not only details of correspondence but of construction as well. The microfilm proved especially useful, because a lot of the material had not been copied and placed into the HARP binders. As stated in the introduction, there are limitations to the use of the HARP materials because of limited cross referencing and indexing, and undecipherable citations or text.

Fort McHenry Files 1933-1984

These files, arranged chronologically in binders alongside the HARP binders, provided data on the National Park Service's management of the fort and seawall.

OTHER MATERIALS

Article

"Plan of Fort McHenry." Maryland Historical Magazine, 8 (1913), pp. 288-290.

This article provided Major John Jacob Ulrich Rivardi's 1794 description of water damage to Whetstone Point.

Book

Kanarek, Harold. The Mid-Atlantic Engineers: A History of the Baltimore District, U.S. Army Corps of Engineers, 1774-1974. Washington, D.C.: Government Printing Office [1979?].

This text provided data on Fort McHenry's early construction history.

Reports

U.S. Department of the Interior, National Park Service, "Historic Structure Report, Fort McHenry Historical and Architectural Data, Fort McHenry National Monument and Historic Shrine, Maryland." by Ervin N. Thompson and Robert D. Newcomb, Denver, October, 1974.

The Thompson text is a history of Fort McHenry's structures and fortifications. It provided the context within which to place the seawall history.

U.S. Department of the Interior, National Park Service, "Archeological Investigations at Fort McHenry National Monument and Historic Shrine 1978, 1980" Vol. I by Bryan L. Aivazian and Louise Schmidlap, Vol. II by William Stokinger, Patricia Rubertone, and Lawrence E. Babits, Denver, July 1982.

U.S. Department of the Interior, National Park Service, "Historic Structures Report, Part I, Fort McHenry National Monument and Historic Shrine, Historical Data Section." by George J. Svejda, Washington, D.C., June 1969.

Both the Aivazian, et. al. and Svejda reports provided background information about Fort McHenry's history and placement of structures.

Pamphlet

"Estimated Cost of Restoration of Fort McHenry" [c. 1925], Fort McHenry Vertical File, Maryland Collection, Enoch Pratt Free Library, Baltimore, Maryland.

This pamphlet provided data on the physical state of the seawall, c. 1925.

PERSONS CONSULTED DURING RESEARCH

S. Sydney Bradford, Philadelphia, Pennsylvania

Susan Long, Historical Architect, National Park Service, Falls Church, Virginia

John H. McGarry, Baltimore, Maryland

William Stokinger, Boston, Massachusetts

Erwin N. Thompson, Lakewood, Colorado

REPOSITORIES VISITED DURING RESEARCH

Baltimore, Maryland

Enoch Pratt Free Library
- Maryland Collection
  - Vertical Files

Fort McHenry National Monument and Historic Shrine
- Fort McHenry Files
- Historical and Archeological Research Project (HARP) Files
- Map Files
- Photograph Files

Maryland Historical Society
- Prints and Photographs
- Vertical Files

Lakewood, Colorado

Rocky Mountain Regional Office Library

HISTORIC STRUCTURE REPORT
Architectural Data
Seawall

FORT MCHENRY NATIONAL MONUMENT AND HISTORIC SHRINE
Maryland

Prepared by

Susan Long

III. EXISTING CONDITIONS

A. Historic Appearance

Historically the seawall was a dry laid wall constructed of granite and sandstone. Rubble, rock-faced, or dressed stone was used for the base of the wall and topped with a capstone. The seawall retains its historic configuration and appearance, although there have been some changes to the wall. The wall has been pointed in some areas and riprap has been placed in front of parts of the wall.

B. Existing Conditions

The seawall lies on the perimeter of Fort McHenry National Monument and Historic Shrine and is approximately 3,770 feet long. The seawall has been totally recorded photographically, and existing condition documents (33 sheets) are available from the Technical Information Center, Denver Service Center. (Dwgs. 346/25004). (Please refer to these documents for the location of station points noted in this narrative.) As already discussed in the history section of this report, the wall was constructed in phases beginning in 1816 and ending in 1897. It should be noted as documented on the drawings that the wall was built of several types and finishes of stone.

C. Present Conditions

In keeping with the objectives of the task directive to record the existing conditions of the wall and make recommendations for its rehabilitation, the causes of failure of the wall will be discussed. A wide range of experts (see individuals and offices consulted) on seawalls with varied backgrounds and expertise have been consulted by this office. All of these experts have agreed on the causes of the deterioration of the seawall.

The seawall is a dry laid gravity wall. The stones are laid in an interlocking pattern and topped with a large capstone which functions to hold the small interlocking stones below it in place. Thus, the wall is designed to function as a massive unit which, when intact, is able to resist the extreme force of waves hitting it.

As already mentioned, the location of the seawall makes it subject to severe wave action from both passing boat traffic and storms. In a storm the waves reach a maximum height of 5-1/2 feet. It should be noted that this is higher than the seawall. As the waves hit and scour the seawall, water passes through the joints between the stones and flush soil from behind the wall causing voids behind the wall and the collapse of fill and grass into the voids. This effect is most obvious from Station 10 + 06 through Station 18 + 47.00 (see photographs 1 and 2 and figure 1). Once the confining soil behind the wall is lost the capstone becomes unstable and wave action is able to lift the capstone. The capstones are displaced and eventually toppled into the harbor (see photograph 3 and figure 2). With the capstone removed the wall no longer acts as a massive unit and begins to unravel (see photograph 3). Although this is happening along the entire length of the seawall it is most obvious from Station 10 + 00.00 through Station 18 + 48.77 because there is no riprap to break the impact of the waves and this section of wall is subject to extreme wave action.

From Station 18 + 48.77 to Station 22 + 84.09 the capstones are displaced and the lower third of the wall protrudes 6 inches to 1 foot 6 inches beyond the upper portion of the wall (see photographs 5, 6, and 7). The condition of the wall at this point is unknown. Further testing should be performed to determine the profile of the wall in this section. The protrusion of the lower stones could be the historic configuration of the wall (see figure 3); however, it is more probable that it is the result of the force of water and plastic soil pushing against the wall. Thus the stones at the base of the wall are being pushed out of place, making the wall structurally unstable (see figure 4). (For amendment to this report, see Appendix A, the archeological investigations and comments.)

From Station 22 + 4.09 to Station 32 + 3.74 the wall is not riprapped. Although fill is still being leached from behind the wall, riprap protects the wall from harsh wave action, thus the wall is stable.

From Station 32 + 07.74 to Station 47 + 55.13 the wall is not riprapped and the stones below mean low water are displaced and missing. However, this section of wall is not subject to extreme wave action and thus remains stable.

PROPOSED WORK PROGRAM

A. Alternative "A" - No treatment

If the seawall is not repaired in the next few years entire sections of the seawall will be lost, resulting in the need for complete reconstruction of the wall in order to protect the point from erosion.

B. Alternative "B" - Pump grout the wall

Pump grouting would stop water from penetrating the wall and pulling out the fill.

It is not the recommended alternative because the seawall has stood as a dry laid wall for over a hundred years and pump grouting the wall would change the functioning of the entire wall system and could cause the wall to become structurally unstable. Additionally, it would also change the historic appearance of the wall and the cost is prohibitive ($700 a linear foot).

C. Alternative "C" - Place riprap in front of the wall

This alternative changes the historic appearance of the wall and does not actually address the causes of deterioration of the seawall. Riprap also carries the hidden maintenance cost of cleaning debris from the riprap.

D. Alternative "D" - Preferred alternative - Place filter fabric and gravel behind wall; reset capstones and pin in place

This alternative has many advantages. The work would not change the historic or function of the wall system or the appearance. It directly addresses the reason for the walls deterioration and the most

economical method of repairing the wall. Placing filter fabric and gravel behind the wall will stop the leaching of soil from behind the wall. Using epoxy and pinning the capstones in place will tie the wall together causing it to act as a massive unit as historically designed and prevent waves from moving the capstones. This is the method of stabilization recommended by the Corps of Engineers, Baltimore office, after physically inspecting the seawall (see figure 5).

E. Multiphase Work Program

In the event funding presents a problem the rehabilitation work on the seawall has been divided into three phases. The three phases citing work to be done are as follows:

1. Phase 1 - All rehabilitation work from Station 10 + 00 through 18 + 48.77. The work in this length of wall consists of placing filter fabric and gravel behind the wall, resetting displaced existing stones or replacing missing and broken stones and placing stainless steel pins to tie the capstones and the block wall together.

2. Phase 2 - All rehabilitation work from Station 18 + 48.77 through Station 22 + 84.09. As previously discussed in the existing conditions section of this historic structure report, the condition of the seawall is unknown in this section. Upon further investigation, if it is found that the lower portion of the wall has been pushed out, the wall will have to be dismantled and rebuilt before filter fabric and gravel are placed behind the wall and the capstones are reset and pinned in place. (For amendment to this report, see Appendix A, the archeological investigations and comments.)

3. Phase 3 - All rehabilitation work from Station 32 + 03.74 through 38 + 59.35. All missing stones shall be replaced using existing or replacement stones. All broken capstones shall be replaced and grouted and epoxied in place.

F. Impact Analysis

Fort McHenry is listed on the National Register of Historic Places and, therefore, implementation of the recommendations in this report will require compliance with Section 106 of the National Historic Preservation Act.

The work proposed for the seawall at Fort McHenry would help preserve the historic scene at Fort McHenry and the Baltimore Harbor. It would retard deterioration of the seawall, and preserve the historic fabric and site.

Applying the criteria of effect, 36 CFR Part 800.3[a], it is determined that the work would have an effect on the structure. However, applying the criteria of adverse effect, 36 CFR Part 800.3[b], it is determined that the effect would not be adverse:

1. The proposed work would not result in the destruction of significant features of the property. The existing fabric would not be significantly changed or destroyed by stabilization of the structure.

2. The proposed work would not isolate the structure from the surrounding environment or alter the surrounding environment. Rather, it would preserve the historic scene.

3. The proposed work would not introduce visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

4. The proposed work would not result in the transfer, sale, deterioration, or destruction of federally-owned property.

This action may be excepted from compliance with Executive Orders 11988, "Floodplain Management," and 11990, "Protection of Wetlands" by applying the criteria in Section 5B3 of the NPS Floodplain Management and Wetland Protection Guidelines. This section identifies as

excepted actions those which are functionally dependent upon water, and for which there is no practicable alternative site outside the floodplain.

Compliance with the National Environmental Protection Act was completed with the May 19, 1982 signing of the Finding of No Significant Impact (FONSI) on the Fort McHenry Resources Management Plan, which addressed the environmental effects of repair and rehabilitation of the seawall.

G. Estimates

Note: These estimates were made in 1983. Allowances should be made for inflation.

Phase 1 - Fort McHenry - Repair Seawall Station 10 + 00 - 18 + 48.77
Place filter cloth and gravel behind wall; drill capstones and epoxy and pin in place.

Description	Quantity	Material	Labor	Equip.	Total	Total Cost
Excavation	848.77 LF				10.80 LF	$ 9,166.72
Hauling	1697.50 CY				3.69 CY	6,263.78
Hand excavation	4243.85				.26 SF	1,103.40
Backfill	1697.50 CY	15.22 CY	1.14	2.04	18.40 CY	30,622.90
Compaction	848.77 LF				3.00 LF	2,546.31
Topsoil and seed	565.85 SY				2.18 SY	1,233.55
Filter cloth and placement	848.77 LF	1.45 LF	1.11	.03	2.59 LF	2,198.31
Granite blocks	800 CF	75.00		5.00	80.00	22,500.00
Coping stone	54.60 CF	97.50		5.00	102.50	5,596.50
Setting (stone existing and new)	1711.10 CF		4.71	9.65	14.36	24,571.40
Mortar	1736 CF	2.30 CF				3,992.80
Drill and set stainless steel rebar	995 LF	10.00	42.67		52.67	52,406.65
Total						$162,202.32
10 percent inflation						178,422.54
15 percent cont.						205,185.92
15 percent o and p						235,963.82
						278.00 LF

Phase 2 - Fort McHenry - Repair Seawall - Stations 18 + 48.77 - 22 + 84.09 - Resetting capstones and add filter fabric and crushed stone. Drill capstones and epoxy and pin in place.

Description	Quantity	Material	Labor	Equip.	Total	Total Cost
Excavation	435.32				10.80 LF	$ 4,701.46
Hauling	1741.28 CY				3.69 CY	6,425.32
Hand excavation	2611.92 SF				.26 SF	679.10
Backfill	1741.28 CY				18.40 CY	52,039.55
Compaction	435.32				3.00 LF	1,305.96
Topsoil and seed	483.69 SY				2.18 SY	1,054.44
Filter cloth	435.32	2.00 LF	1.50 LF		3.50 LF	1,523.62
Coping stone	57.75 CF	97.50		5.00	102.50 CF	5,919.38
Setting coping stone (new and existing)	205.80 CF		4.71	9.65	14.36 CF	2,955.29
Mortar	367.50 CF	2.30 CF			2.30 CF	845.25
Drill and set stainless steel rebar	220 LF	10.00	42.67		52.67	11,587.40
Total						$ 89,036.78
10 percent inflation						98,940.45
15 percent cont.						112,631.51
15 percent o and p						129,526.24
						248.00 LF

Phase 2 - Fort McHenry - Repair Seawall - Stations 18 + 48.77 - 22 + 84.09
Dismantle and rebuild wall. Further investigation needed to determine if this approach is necessary--if not necessary see estimate previous page.

Description	Quantity	Material	Labor	Equip.	Total	Total Cost
Remove and replace rip rap	799 CY			9.65	9.65	$ 7,710.35
Sheeting	76 tons	580	250		830	63,080.00
Demolish and rebuild wall	1354.33 CY				500.00 CY	677,165.00
Excavate	1788.89 CY		1.85 CY	1.59 CY	3.44 CY	6,153.78
Wood bracing	4600 SF	.90 SF	2.59 SF		3.49 SF	16,054.00
Remove sheeting	766 CY		1.84 CY	2.63 CY	4.47 CY	3,424.02
Backfill, air tamped	1788.89 CY		1.19	3.31	4.50	8,050.01
Place filter cloth and gravel. Pin capstones in place (see previous sheet)						69,036.78
Total						$850,673.96
Plus 10 percent inflation						935,741.33
Plus 15 percent cont.						1,076.102.50
Plus 15 percent o and p						1,237,517.90
						2,842.78 LF

Phase 3 - Fort McHenry - Repair Seawall - Stations 32 + 03.74 - 38 + 59.35
Replace all missing stones - fill all void in seawall.

Description	Quantity	Material	Labor	Equip.	Total	Total Cost
New stone	218 CF	60.00 CF			60.00 CF	$ 13,080.00
New coping stone	40 CF	97.50 CF		5.00	102.50 CF	4,100.00
Set new and existing stone	400 CF		4.71	9.65	14.36 CF	5,744.00
Mortar	50 CF	2.30 CF				115.00
Total						23,039.00
Plus 10 percent inflation						25,342.90
Plus 15 percent cont.						29,144.34
Plus 15 percent o and p						33,515.99
						51.12 LF

ILLUSTRATIONS

Figure 1: Soil flushed out from behind wall and resulting void

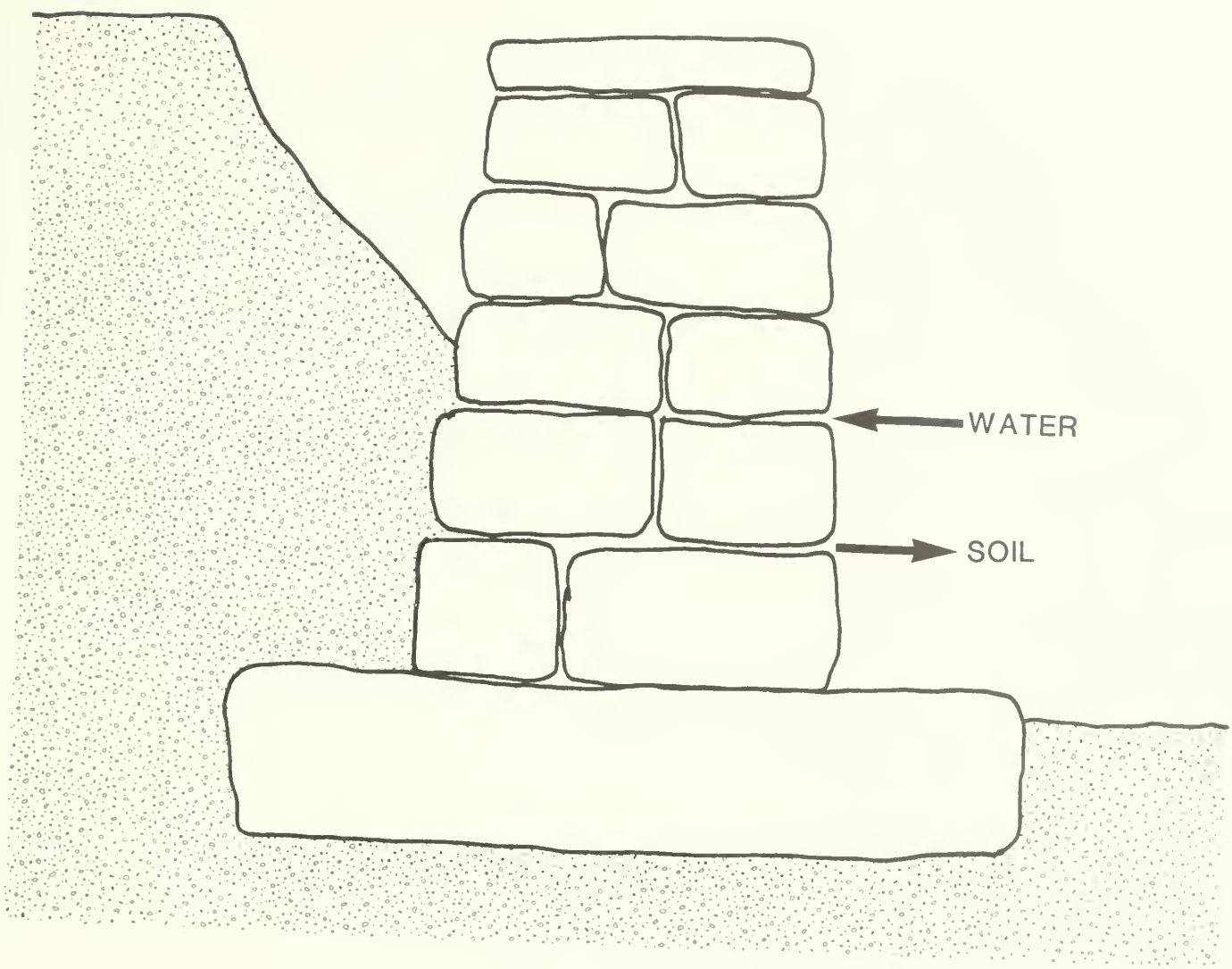

WATER
SOIL

Figure 2: Capstone displaced and toppled into harbor

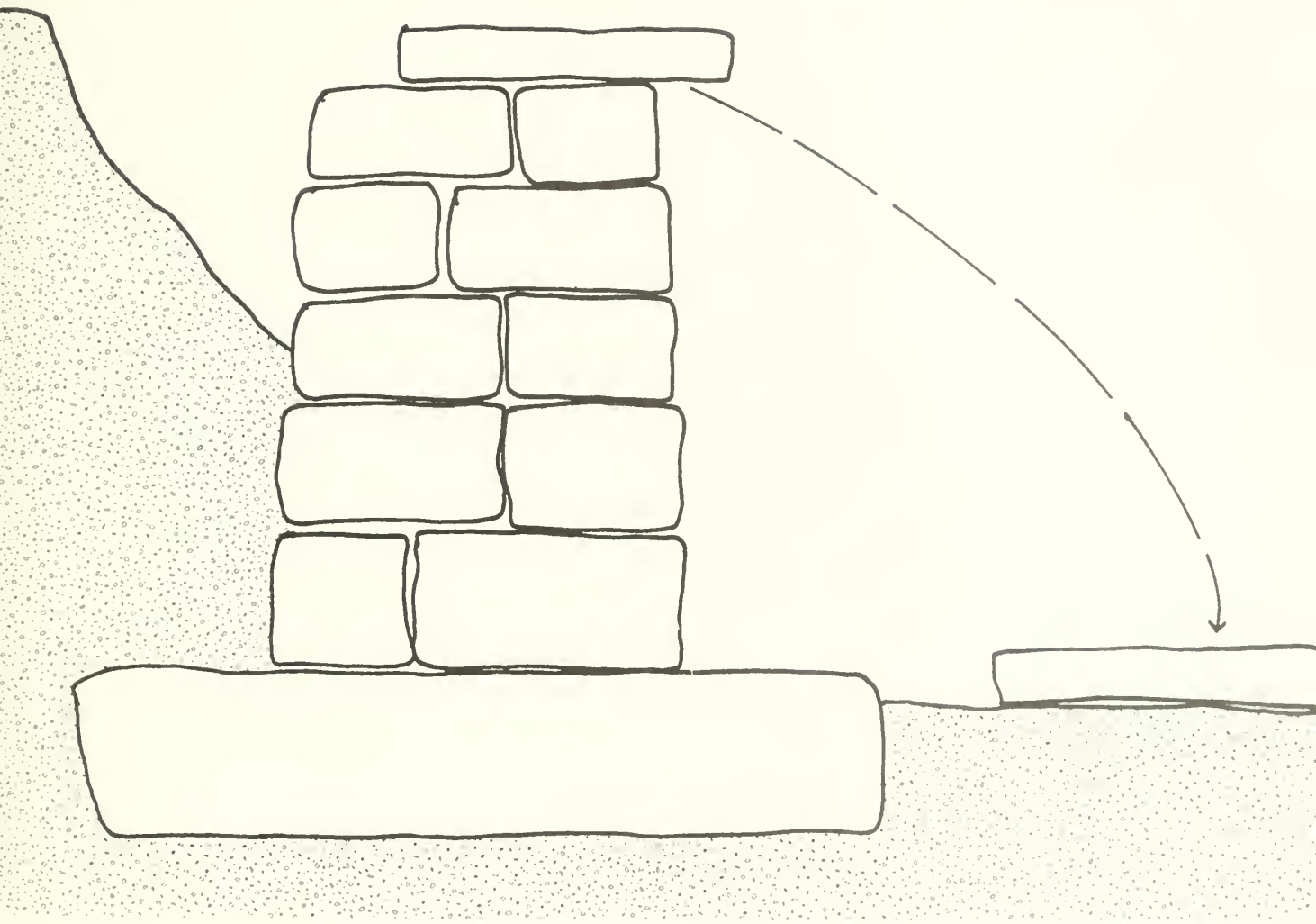


Figure 3: Section of wall if protrusion is the historic configuration

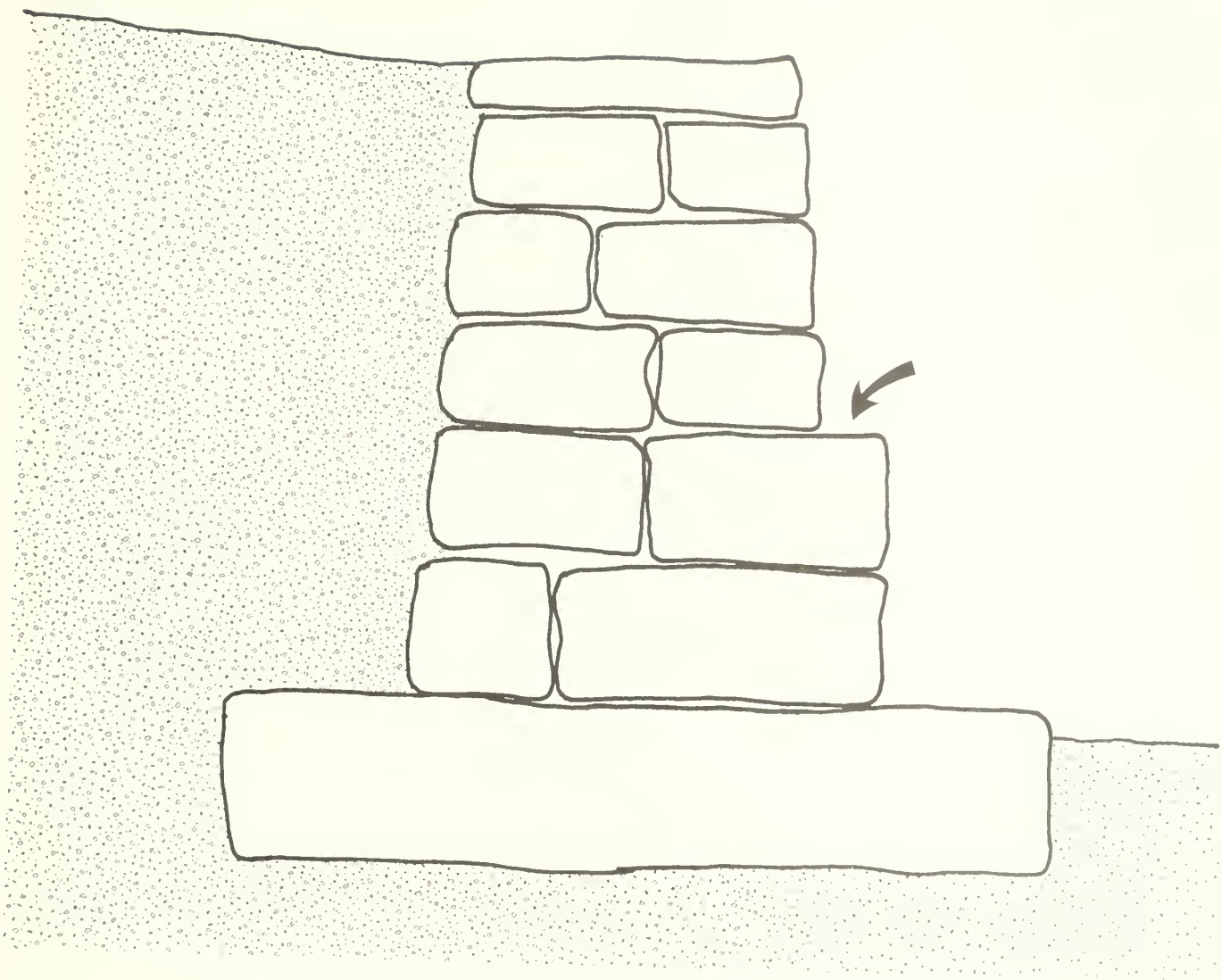
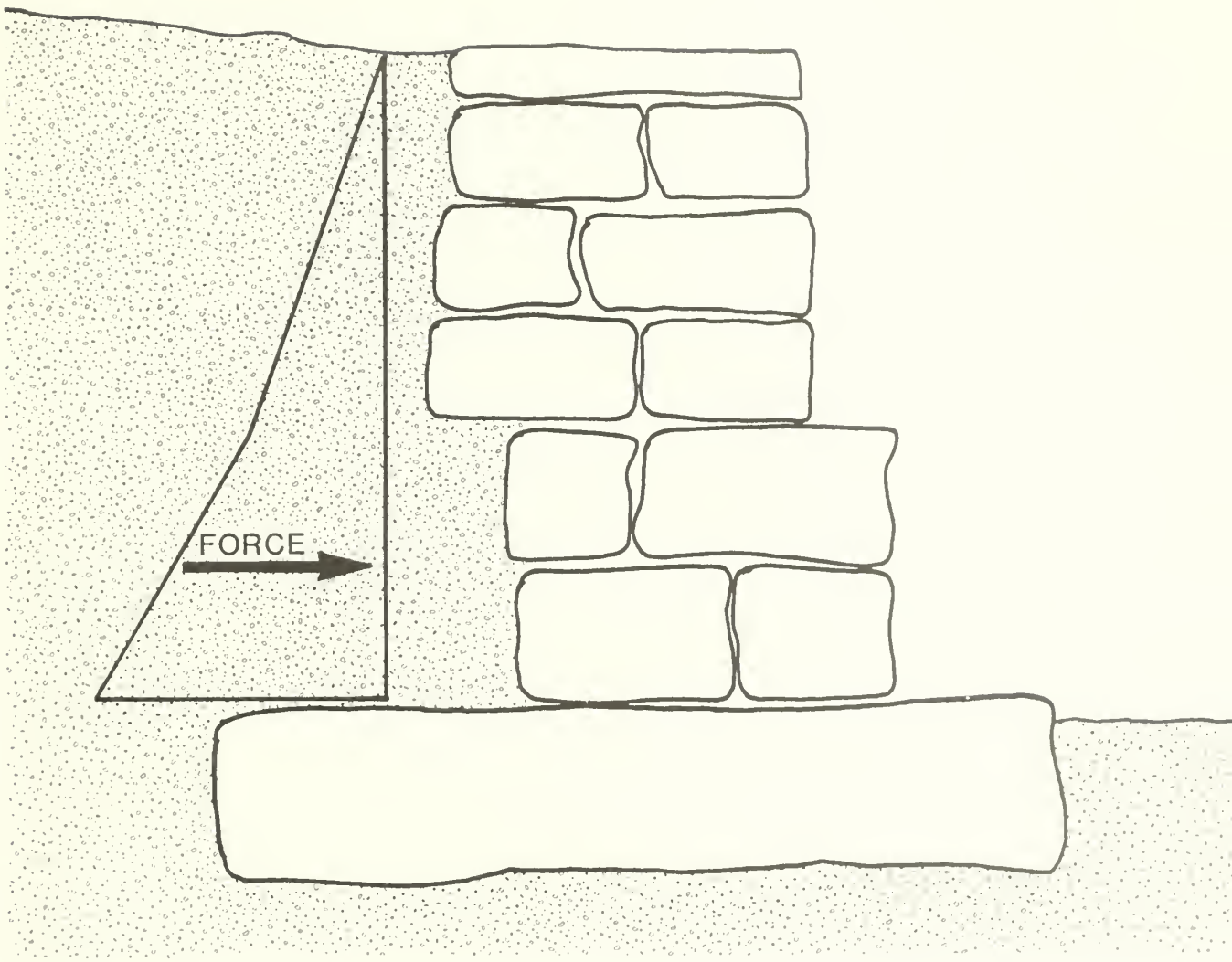


Figure 4: Lower third of wall displaced due to force created by water and plastic soil behind wall


FORCE

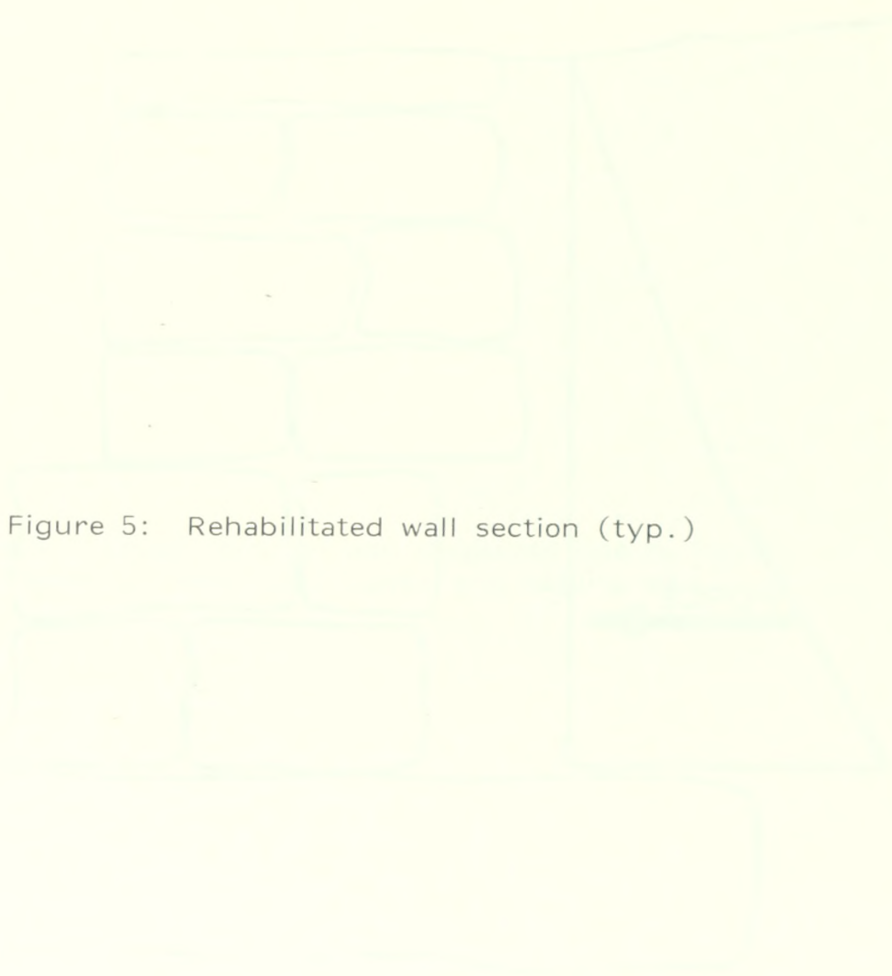
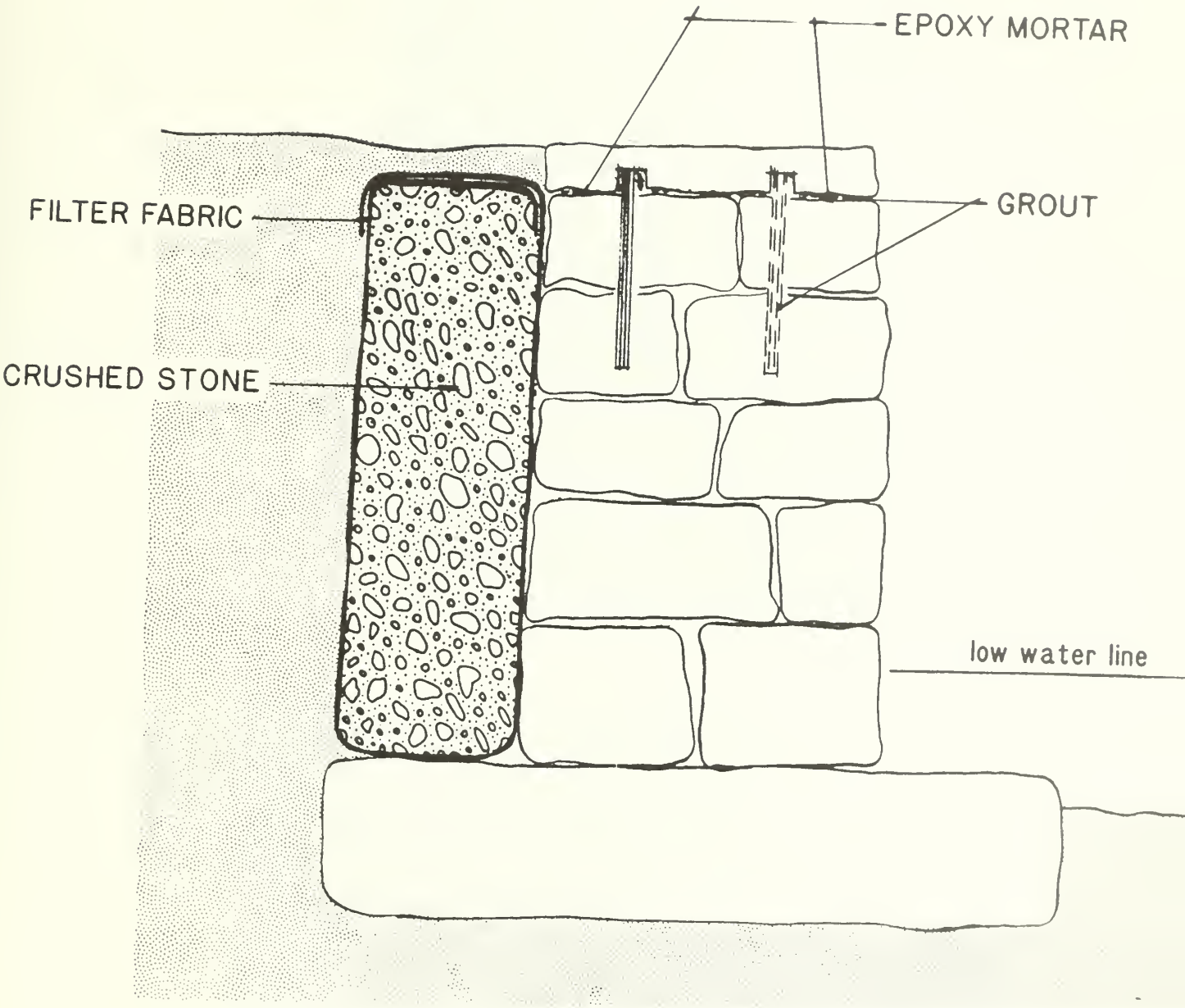


Figure 5: Rehabilitated wall section (typ.)


EPOXY MORTAR
FILTER FABRIC
GROUT
CRUSHED STONE
low water line

Photograph 1: Station 11 + 97.05 looking south capstones displaced due to loss of soil

Photograph 2: Detail of void behind wall

Photograph 3: Displaced capstone toppled into harbor

Photograph 4: Station 13 + 17.05 - Station 13 + 84.05.
Unraveled section of wall

Photograph 5: Station 18 + 00. Protruding lower third of wall

Photograph 6: Station 16 + 39.04 looking south.
Protruding lower third of wall

Photograph 7: Station 18 + 00 looking south.
Protruding lower third of wall

APPENDIX A: ARCHEOLOGICAL INVESTIGATIONS AND COMMENTS

This amendment to the report is a result of the archeological investigations conducted at the seawalls of Fort McHenry. Based on these findings, the seawall is sound of structural stability and not in imminent danger of collapse. The 'step' as viewed in three photographs (photos 5-7) can be viewed as either a cultural feature of the wall or an evidence of wall repair that took place above the 'step'. No repairs as described for Phase II (dismantling and rebuilding) are needed for this section of the seawalls.

United States Department of the Interior
DENVER SERVICE CENTER - EASTERN TEAM
NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

H3015(DSC-TEA)
FOMC-149

JUN 02 1985

Memorandum

To: Chief, Falls Church Branch, Eastern Team, DSC

From: Chief, Applied Archeology Center, DSC-TEA

Reference: Fort McHenry National Monument and Historic Shrine, Package No. 149; Rehabilitate 4,000 foot Historic Seawall, Historic Structure Report

Subject: Distribution of Management Report

Enclosed for your information and records is a copy of the Management Report for the referenced project. Additional copies are being sent to other DSC-TEA professionals concerned with the project. The purpose of this report is simply to document existing structural conditions for construction drawings and to provide information about the resources located along the seawall. Although further review of this report is not required or expected at this time, Ellen Seidel, NPS Staff Archeologist, would welcome any comments you may have.

(SIGNED)

Douglas C. Comer

Enclosure

cc:
DSC-TEA-Mr. Raithel
DSC-TEA-Mr. Cellar
DSC-TEA-Mr. Witmer
DSC-TEA-Mr. LaFleur
DSC-EAF-Mr. Fields
DSC-EAF-Mr. Donald

ARCHEOLOGICAL MANAGEMENT REPORT

FORT MCHENRY NATIONAL MONUMENT AND HISTORIC SHRINE

Spring, 1986, Season

1. Package Identification

Fort McHenry National Monument and Historic Shrine, Package No. 149; Rehabilitate 4,000 foot Historic Seawall, Historic Structure Report.

2. Construction Location and Description

Construction locations are identified by station number (Figure 1), as listed below.

Sta. No.	Proposed Construction
10+00-22+34.09	Excavate trench behind seawall 1 to 6 feet wide to base of wall, line trench with filter cloth, backfill with stone
	Fill voids in wall
	Pin stones in place
22+84.09-32+03.74	No work
32+03.74-38+59.35	Fill voids in wall
38+59.35-park boundary	No work

3. Dates of Archeological Investigations

March 24-26, April 7-May 2, 1986: Fieldwork
May 5-May 23, 1986: Labwork, report preparation

4. Personnel

Project Archeologist, NPS: Ellen Seidel
Field Director, CPSUA: Paula Zitzler
Crew, CPSUA: William Batterman, Kim Becker, Heather Bouslog, Karen Orrence

5. Purpose and Location of Archeological Investigations

Excavation units were located to obtain both archeological and architectural data, specifically, 1) to determine if the existing shape of

the seawall is as originally constructed/repaired or if the wall is presently being deformed by natural causes, and 2) to determine the presence/absence of significant archeological deposits adjacent to the seawall.

Prior to initiating fieldwork, an examination of a sample of historic maps suggested that several historic features may be present along the seawall, as summarized below. The test excavations were located to test both architectural and non-architectural areas along the impacted portions of the seawall.

Sta. No.*	Historic Data	Archeological Investigation
10+00	Wharf (1834)	Not tested due to presence of subsurface utilities
11+97	Wharf (1888)	Excavation units 2, 3
15+25	Water battery, north end (1888)	Excavation units 4, 5
21+08	None (architectural test)	Backhoe trench 1
22+03	None (architectural test)	Excavation unit 1
22+84	Water Battery, south end (1888)	Not tested
27+44	Unidentified structure (1888)	No work area
32+03	Unidentified structure (1888); rifle range (1912)	Excavation units 6, 7

*Approximate

6. Results and Interpretations

A. Architectural details of the seawall were uncovered in each test, as illustrated in Figure 2. These details indicate that the wall is not eroding but was built and repaired in the shape illustrated.

B. The location of a historically documented structure was verified in Excavation Units 6 and 7 (Figure 3). The structure was noted but not identified on the 1888 map, but in 1912 it was identified as the target area of the rifle range.

C. NO SIGNIFICANT RESOURCES were discovered in Excavation Units 1-5, and Backhoe Trench 1.

D. Fill was observed at all tested locations.

E. Base of the seawall was not reached in any excavation because of safety considerations and water table.

7. Evaluation of Discovered Resources

The IN SITU FEATURES UNCOVERED AT STATION 32+03 ARE SIGNIFICANT because they are documented historically and are the only tested location on the seawall where relatively undisturbed deposits exist.

NO SIGNIFICANT ARCHEOLOGICAL RESOURCES WERE IDENTIFIED IN EXCAVATION UNITS 1 THROUGH 5 AND BACKHOE TRENCH 1. It is obvious that these areas were extensively filled, and, while some of this filling was apparently done historically, the disturbed nature of these deposits makes them insignificant resources.

8. Impact of Project on Resources

Construction Phases I and II will destroy any resources within 6 feet of the seawall. Disturbance will be to the base of the wall, but archeological test excavations to date have been relatively shallow, only 3-4 feet below the top of the wall. Therefore, FINAL EVALUATION OF THE IMPACT CAN ONLY BE FULLY ASSESSED AFTER MACHINE TESTING (tentatively scheduled for September 1986), which will penetrate to the full depth of the base of the seawall.

Construction Phase III will not impact the significant resources discovered near station number 32+03, as long as work is confined to the exposed face of the seawall. If Phase III involves any excavation behind the seawall, the significant resources will be adversely impacted.

9. Recommendations

A. Clearance is not recommended for Phase I and II construction until the results of machine-testing in September 1986 are known.

B. Qualified clearance is recommended for Phase III construction, even though significant resources are present. As long as construction activities are limited to the exposed face of the seawall, the significant resources will not be adversely impacted. However, if construction will involve excavation behind the seawall, or if heavy equipment will be operating at ground surface near the significant resources, these resources will be adversely impacted and an appropriate data recovery program must be implemented.

C. Machine-testing in September should be conducted as often as possible during low tide, to insure that maximum depth can be reached behind the seawall without inundation.

Prepared by:

Paula Zitzler CPSUA	Ellen Seidel NPS

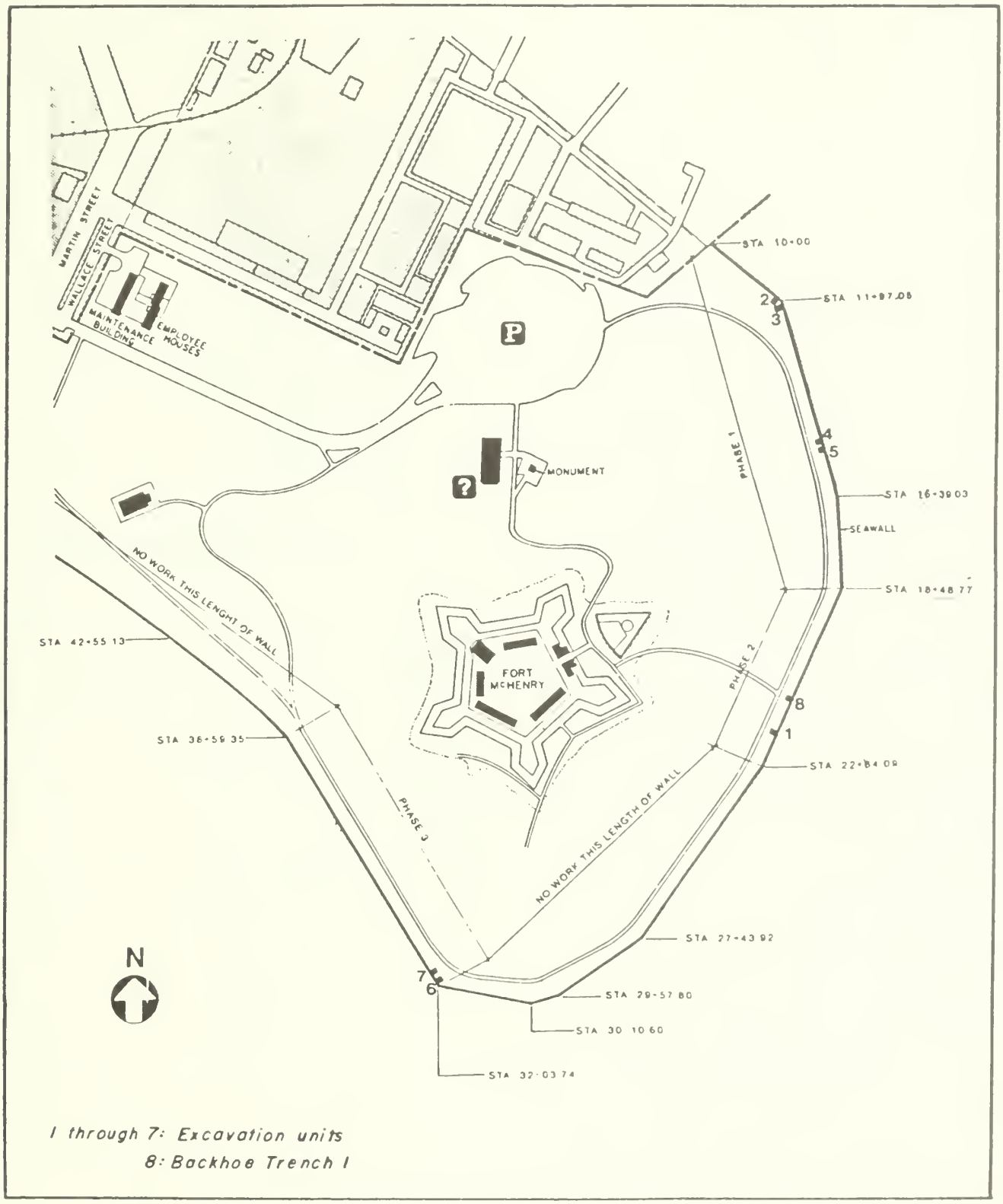


Figure 1. Location of archeological tests, Fort McHenry National Monument and Historic Shrine, Package No. 149. April 1986.

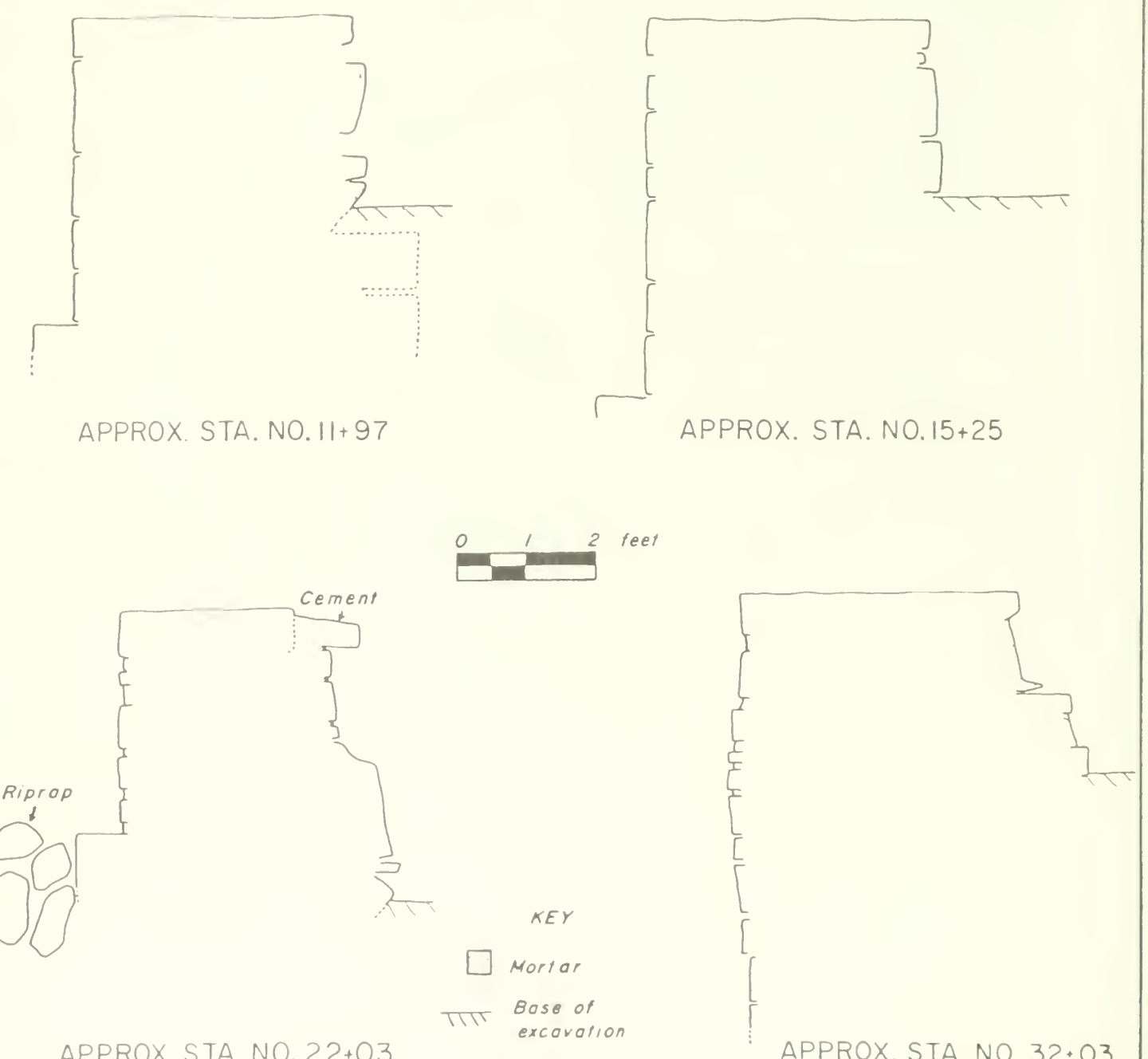


Figure 2. Seawall cross-sections, Fort McHenry National Monument and Historic Shrine, Package 149. May 1986

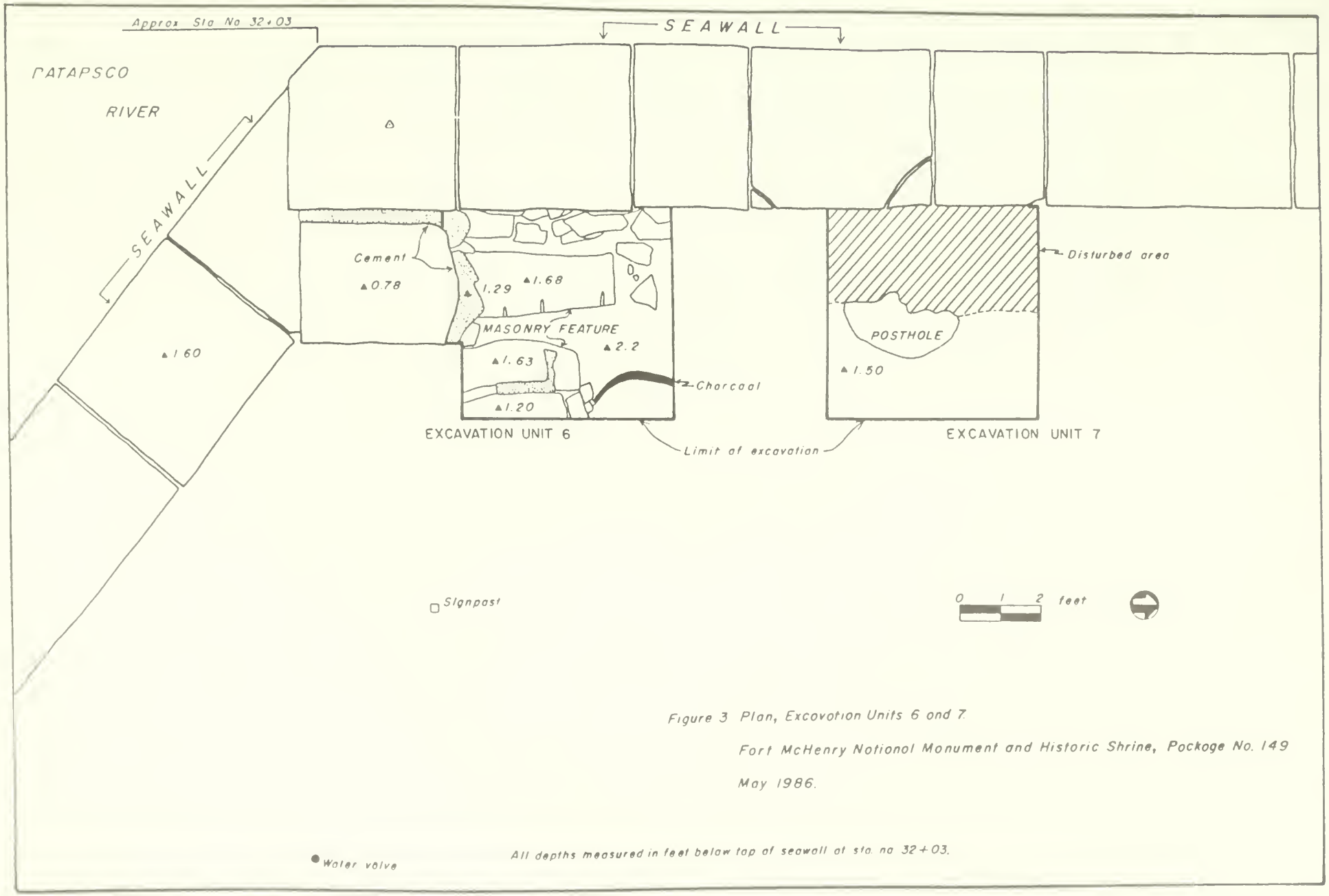


Figure 3 Plan, Excavation Units 6 and 7

Fort McHenry National Monument and Historic Shrine, Package No. 149

May 1986.

INDIVIDUALS AND OFFICES CONSULTED

*U. S. Army Corps of Engineers, Baltimore District
Clinton Anuszewski, Civil Engineer
P.O. Box 1715
Baltimore, MD 21203
301-962-4315

*U. S. Army Corps of Engineers, Baltimore District
William Baldwin, Jr., Engineering Geologist
P.O. Box 1715
Baltimore, MD 21203
301-962-4451

U. S. Army Corps of Engineers
Peter Hart, Engineering Geologist
20 Massachusetts Avenue, N. W.
Washington, D. C. 20314
202-272-0207

U. S. Army Corps of Engineers
George Hubfer, Civil Engineer
P.O. Box 1715
Baltimore, MD 21203
301-962-2002

U. S. Army Corps of Engineers
John Lockwood, Civil Engineer
20 Massachusetts Avenue, N. W.
Washington, D. C. 20314
202-272-0228

U. S. G. Construction
Edward Mokelligett, Project Manager
Billford, S. C.
803-524-1672

U. S. Army Corps of Engineers
Dale Munger, Soil Engineer
20 Massachusetts Avenue, N. W.
Washington, D. C. 20314
202-272-0207

---

* If further contacts need to be made with the U. S. Army Corps of Engineers, Clinton Anuszewski and William Baldwin are most knowledgeable about the seawall at Fort McHenry. They conducted a physical investigation of the site and were involved in the stabilization of the section of the Fort McHenry seawall that is the property of the Coast Guard. They were also involved in the stabilization of the seawall at Fort McNair which is a similar historic structure.

Department of Inspection in Hydrology License Administration
Federal Energy Regulatory Commission
William Trautween, Engineering Geologist
825 North Capitol Street, N. E.
Washington, D. C. 20426

Rummell Klepper & Kahl Consulting Engineers
Edward Zigler, Civil Engineer
1035 North Calvert Street
Baltimore, MD 21202

REFERENCES CONSULTED

U. S. Army Corps of Engineers. Low Cost Shore Protection.

U. S. Army Corps of Engineers. Low Cost Shore Protection . . . A Guide for Engineers and Contractors.

U. S. Army Corps of Engineers. Low Cost Shore Protection . . . A Guide for Local Government Officials

U. S. Army Corps of Engineers. Low Cost Shore Protection . . . A Property Owner's Guide

•U.S. GOVERNMENT PRINTING OFFICE 1986 0 676 070 40002

As the nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Publication services were provided by the graphics staff of the Denver Service Center. NPS D20, August 1986